MARCH, 1956

Traffic Engineering

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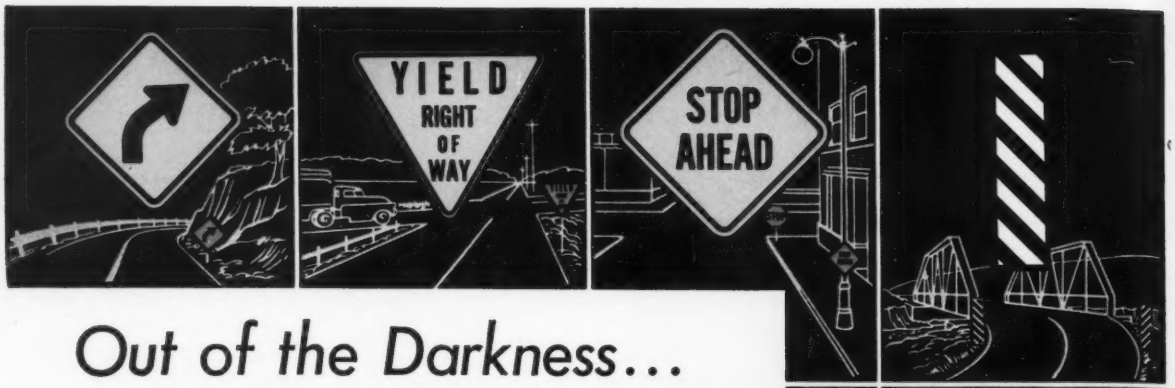

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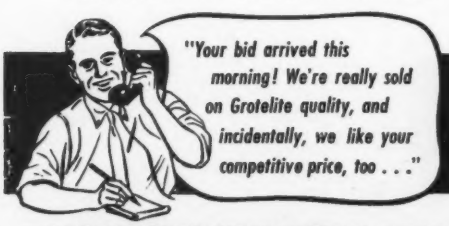
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COVER: Eye-arresting horizontal and diagonal patterns form pedestrian paths at the busy intersection of 34th Street and 7th Avenue in Midtown Manhattan, New York City, marking an innovation in pedestrian control in the bustling area. The stripes are part of new aims by the Department of Traffic to increase safety and expedite movement.

DEFINITION: Traffic Engineering is that phase of engineering which deals with the planning and geometric design of streets, highways, and abutting lands, and with traffic operation thereon, as their use is related to the safe, convenient, and economic transportation of persons and goods.

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Frankly Speaking

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Somewhere in our organization there is a young man destined to become President of our Institute in 1970. If we knew his identity today, we would probably notice this about him: (1) He is very active in committee work. (2) He is playing an important role in his local chapter affairs. (3) He has a profound interest in traffic engineering. (4) He has a belief in the future of this profession. If this future President were to look back to 1956, he probably would not recognize the Institute of that day as contrasted to the Institute of 1970. He will, no doubt, be faced with much bigger problems than we have today. It will be an organization much greater than any of us have ever dreamed—our budget alone in the last five years has increased approximately 100%. This, of course, indicates that our membership is rapidly rising and will continue to do so in the years ahead.

The rise in the membership, of course, is largely attributed to the need for more traffic engineers. In the past three years, I have travelled over 20,000 miles in the United States and was amazed to find a great need for traffic engineering service, particularly in urban areas. Actually, we are still in our infancy, not only as far as the availability of qualified traffic engineers goes, but also with respect to techniques required to move traffic safely and efficiently.

It is to our younger members that we must look for future progress in our profession. Through their efforts, research and interest in this field can we expect to make greater progress. On the other hand, the guidance of our seasoned members will play an important role. Through the combined efforts of our veterans and younger members, we will build an organization that will reach proportions beyond our fondest hopes—an achievement which our 1970 President will no doubt be proud!

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The Measurement of Traffic Flow

By Eugene J. Clifford (Assoc. Mem., ITE)
Chief, Division of Traffic Engineering, Montgomery County, Rockville, Maryland

INTRODUCTION

THE PAST FEW YEARS have brought several new concepts in the measurement of traffice flow. Some of these ideas are based on scientific studies conducted under many different conditions, some are an outgrowth of the rural sufficiency measures used by state highway departments, and some are simply arbitrary schemes for rating street use. Many of these new approaches were inspired by the fine work done in this field by Mr. C. A. Rothrock[1] and Mr. Donald S. Berry.

In September 1955, studies were conducted in Silver Spring, Maryland, and nearby Washington, D.C., in an effort to compare several of these methods. The major purpose of these studies was to determine the best method to be used in establishing a priority system for traffic improvements. In other words, we were looking for a method which would result in a deficiency rating rather than a sufficiency rating.

Three routes were chosen between a junction of two major arteries in Washington and a point in the heart of the residential area of Montgomery County. The 10.1 miles of routes were divided into 13 sections, the shortest of which was 0.19 miles in length and the longest 1.32 miles. Sections with street widths of from 22′to 68′ were included and peak hour volumes of from 300 to 2000 vehicles were experienced. The area is suburban in character and a majority of the mileage was through residential development; however, several sections passed through the business district of Silver Spring, Maryland, which is comparable to the business district of a town of 25—50,000. All of the routes were protected by STOP signs, with major intersections signalized.

Through the courtesy of the staff of the Yale University Bureau of Highway Traffic, a recording speedometer was used to assist in gathering the field data. Data was collected by a two-man crew, driver and recorder. The recorder read and recorded stop watch readings and, in addition, coded intersections and control points on the recording speedometer. Five runs were made over each section and the starting times were distributed between the hours of 4:15 and 6:00 P.M. on five different weekdays within a two-week period. Weather and light conditions were uniformly good during all runs.

Methods Used

Opinion Rating

Each of the sections was first subjected to an opinion rating by five qualified engineers who drove over the routes during the evening peak hours. The drivers were asked to drive through each route and then to score the various sections as to their congestion or lack of it. The sections were rated with 20 points being applied to the most congested and so on in descending order. The results of this opinion rating are shown in the summary appearing later.

TABLE I
Study Sections

Section No.	Street	Terminals	Length	Width	Av. Peak Hr. Volume	Character
1.	Piney Branch Road	Sheridan to Blair	0.83	2/26′	2000	Residential—divided roadway—peak hour parking restrictions.
2.	Piney Branch Road	Blair to Philadelphia	0.57	36′	2000	Residential—no parking.
3.	Piney Branch Road	Philadelphia to Sligo	0.59	46′	2000	Residential.
4.	Piney Branch Road	Sligo to Dale	0.27	46′	1930	Neighborhood business district
5.	Dale Drive	Piney Branch to Colesville	1.32	24′	370	Residential—secondary arterial—poor alignment and grade.
6.	Dale Drive	Colesville to Georgia	1.06	24′	300	Residential—secondary arterial—poor alignment and grade.
7.	Georgia Avenue	Sheridan to Eastern	1.29	60′	1500	Strip development. Street car tracks.
8.	Georgia Avenue	Eastern to Colesville	0.90	60′v	1500 One-way	Divided roadway business district, progressive signals.
9.	Georgia Avenue	Colesville to Dale	1.12	2/34′	1500 One-way	Divided roadway, residential.
10.	Colesville Road	2nd Avenue to Georgia	0.19	40′	1800 One-way	Strip business development.
11.	Colesville Road	Georgia to Dale	0.72	54′	950 One-way	Business and residential.
12.	East-West Highway	Georgia to Colesville	0.95	40′	630	Strip business development.
13.	2nd Avenue	Colesville to Dale	1.15	24′	620	Secondary arterials—residential.

Vehicle Delay Rate—National Committee Method

This method has been deviesd for the National Committee on Urban Transportation by Mr. C. C. Robinson of the Automotive Safety Foundation and will be used as the basis for a street service rating method to be included in their national manual. This method of evaluating street service

1. "Urban Congestion Index Principles", *Urban Traffic Congestion, Bulletin 86* Highway Research Board, Washington, D. C., 1954.

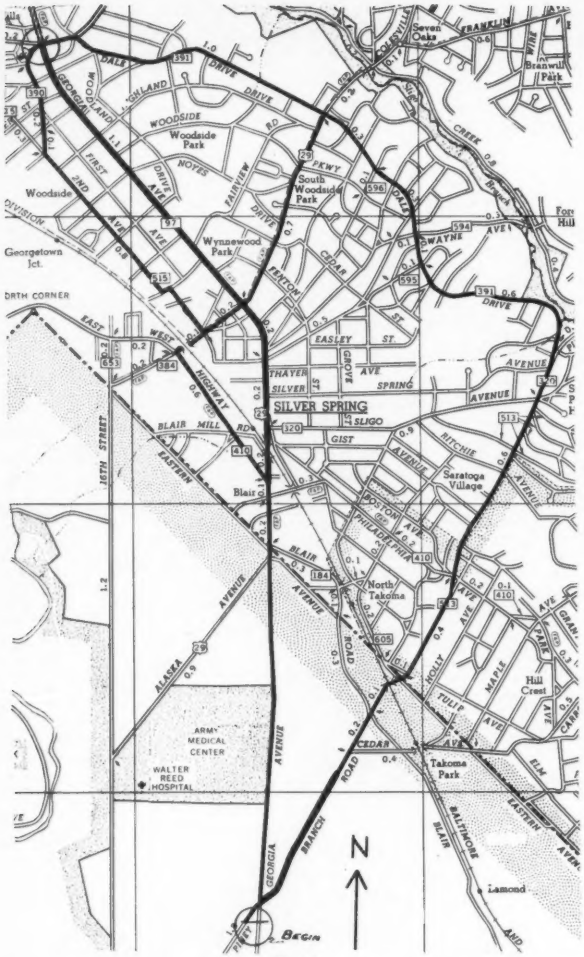

Fig. 1
Vicinity map showing major routes between Washington, D. C., and Silver Spring, Maryland.

develops a "Vehicle Delay Rate" which is expressed in total minutes of delay per mile during the peak hour and can be found by applying this formula:

$$R_1 = \frac{(t - t')\ V}{1000}$$

The average travel time is computed for five runs over each course and the rate of motion in minutes per mile is determined. This rate of motion is t. A "standard rate of motion" (t′) of 2.4 minutes per mile (equal to 25 M.P.H.) is subtracted from t to determine the delay rate. This value is then multiplied by the peak hour volume V, to determine the vehicle delay rate. The vehicle delay rate may be thought of as the total number of vehicle minutes lost per mile of travel due to the inability of the traffic stream to move at 25 M.P.H. This 25 M.P.H. is, of course, an arbitrary value and other speeds could be substituted without altering the relative results.

For the routes discussed here, the office work, including computing the relative error of the mean, required approximately two hours.

Quality of Transmission and Efficiency Index—The Greenshields Method

This method evaluates the quality of transmission of traffic by means of the formula: $Q = \frac{ks}{\Delta s \sqrt{f}}$, in which S is the average speed, Δ s is the total change in speed per mile, f is the frequency of speed change and k is a constant of 1000.

The frequency and magnitude of speed changes are measures of turbulence of flow which, in turn, is directly related to the comfort and desirability of the route from the driver's viewpoint. Introduction of these factors into the computation gives recognition to this important comfort element.

The efficiency index is determined by multiplying the Q value by the peak hour volume per lane (A lane is defined as a 10′ width). By considering this element the concept of efficiency is modified so that it is not just a measure of the traffic stream but rather a measure of the performance of the street itself.

The collection of field data requires a recording speedometer in order to have a continuous record of vehicle speed, distance traveled and elapsed time. For the thirteen sections studied here, the office time required to transcribe the information from the recorder tape and to compute the Q value was about eight hours.

A more complete discussion of this method may be found in *A Proposed Measure of the Quality of Traffic Transmission* by Dr. Bruce D. Greenshields.[2]

Measure of Congestion—"Easy" Method

The so-called "Easy" method of measuring congestion involves only two values for each route studied. This measure expresses the relative congestion of the route in terms of a ratio between overall speed and running speed and is found from: $Mc = \frac{S}{SR}$, in which S is the overall speed and SR is the running speed. For each route, the distance is a constant and therefore the formula becomes: $Mc = \frac{tr}{t}$ in which tr is the average running time and t is the average overall time.

In this system, the distance for each route may be measured but is not essential. The overall travel time and the running time are recorded for each trip and the average of five trips is substituted in the formula. The office time required in this study was about 30 minutes.

Index of Congestion—Clifford Point Method

This method is an attempt to rate street congestion with a minimum amount of computations. During each trip, the recorder notes the length of each delay and whether it took place at an intersection or mid-block. Points are then assigned to the trip in the following manner:

1. Number of delays—1 point for each delay.
2. Location of delay—1 point if at intersection.
   2 points if mid-block.
3. Length of delay—1 point for first 30 seconds.
   2 points for each 15 seconds over 30.

The index of congestion is then computed from the following formula: $Ic = \frac{A}{P} = \frac{\text{Actual Score}}{\text{Permissible Score}}$

$Ic = \frac{\Sigma \text{ Points}}{3\ D}$, in which D is the distance in tenths of a mile.

2. Technical paper delivered before the Highway Research Board, Washington, D.C., January 1955.

Fig. 2
Looking north along Georgia Avenue in the Silver Spring business district.

This, of course, is an arbitrary approach which also attempts to evaluate the route in terms of the driver's reaction. It is assumed that a driver will tolerate no more than one stop each tenth of a mile in urban traffic, which may be questionable. An I_c of 1.00 is considered as tolerable, less than 1.00 is good while more than 1.00 indicates the need for correction.

In this study, the office work required approximately 2 hours.

Comparison of Methods

Each of the thirteen sections were rated by the seven methods just discussed but no common ground can be found for comparing such widely differing values. In order to provide some basis for comparison, each section was assigned a rank which reflects its position in descending order of congestion, as determined by each method. The various ranks assigned to each route section were combined to form a composite rank by computing an arithmetical mean (excluding the opinion rating). It should be remembered that these are numerical ranks rather than the actual ratings.

The route sections are listed in Table II in order of their composite rank, along with their ranks as determined by each of the methods used. It should be noted that all of the systems are generally in agreement on which routes are worst and which are best in the matter of congestion. With only two exceptions, all methods agree which 5 sections are the worst but do not agree upon their degree of congestion. An example of this is Georgia Avenue from Sheridan Street to Eastern Avenue which the drivers rated as being most congested. All other methods applied rated this section either fourth or fifth. The driver's opinions of this route may have been influenced by the existence of a major street railway line with numerous passenger loading platforms.

All the methods also generally agreed as to which routes were least congested but, again, not necessarily in the same order. Both sections of Dale Drive have the same general physical characteristics and both have rather low peak hour volumes. This appears to have caused the difference in results.

Results of study

The opinion rating seems to be the least desirable approach in determining congestion except in the most obvious areas. A priority improvement program based on such ratings

TABLE II
Comparison of Various Measures by Rank

Section	*Opinion*	*National Delay Rate*	*Vehicle Delay Rate*	*Greenshields Q*	*Greenshields E*	*Easy*	*Clifford*	*Composite*
Colesville Road—2nd to Georgia	3	1	1	1	2	1	1	1
East-West Highway—Georgia to Sheridan	4	2	5	2	1	2	2	2
Georgia Avenue—Eastern to Colesville	2	3	3	3	3	3	3	3
Piney Branch Road—Sheridan to Blair	5	6	2	4	6	4	4	4
Georgia Avenue—Sheridan to Eastern	1	4	4	5	4	5	5	5
Colesville Road—Georgia to Dale	7	5	6	6–7	5	6–7	6	6
Second Avenue—Colesville to Dale	11	7	8	6–7	7	6–7	7–8	7
Piney Branch Road—Sligo to Dale	10	8	7	10	10	8	7–8	8
Piney Branch Road—Blair to Philadelphia	8	9–11	9–10	8–9	11	10	9–10	9
Georgia Avenue—Colesville to Dale	6	9–11	11	11	8	9	9–10	10
Piney Branch Road—Philadelphia to Sligo	9	9–11	9–10	8–9	9	12–13	12	11
Dale Drive—Piney Branch to Georgia	13	12–13	12–13	13	12	11	11	12
Dale Drive—Piney Branch to Colesville	12	12–13	12–13	12	13	12–13	13	13

Fig. 3
Georgia Avenue near Colesville Road. This intersection, the busiest in Montgomery County, Maryland, handles 60,000 vehicles per day.

would be too easily influenced by personal attitudes or prejudices of the engineers. Its best application would be in determining areas to be given further study by some other method. It might also be used as a comparative measure in connection with another method.

The National Committee's Delay Rate generally varies very little from the composite ratings while the Vehicle Delay Rate varies from the composite in 7 of the 13 sections. In both rates there seems to be some indecision in the freer flowing routes. This could be accounted for by the low volumes and the seeming lack of serious congestion on these streets.

The Greenshields Quality of Transmission (Q) varies from the composite in five cases, four of which are in the least congested areas. This method compares quite favorably with the composite in the first 10 sections while the efficiency rating varied in nine sections. The variation in Q values is not serious and can probably be attributed to the character of the routes.

The Easy method appears to be a satisfactory approach in the worst areas but becomes somewhat erratic below the first five sections. Here, the simplicity of the computations is quite inviting but may prove to be inaccurate or at least indecisive in free-flowing or marginal routes.

The last method to be considered is the Clifford Point Method. This method is similar to the Easy method in that it seems to rate the most congested areas properly but is inconclusive on free-flowing streets. This might be accounted for by the arbitrary assumption that a driver will tolerate even one stop every tenth of a mile on all streets. This assumption seems fair on the busiest streets but quite untrue in marginal and outlying areas. Perhaps this method should be applied only in central business districts or on other heavily developed routes.

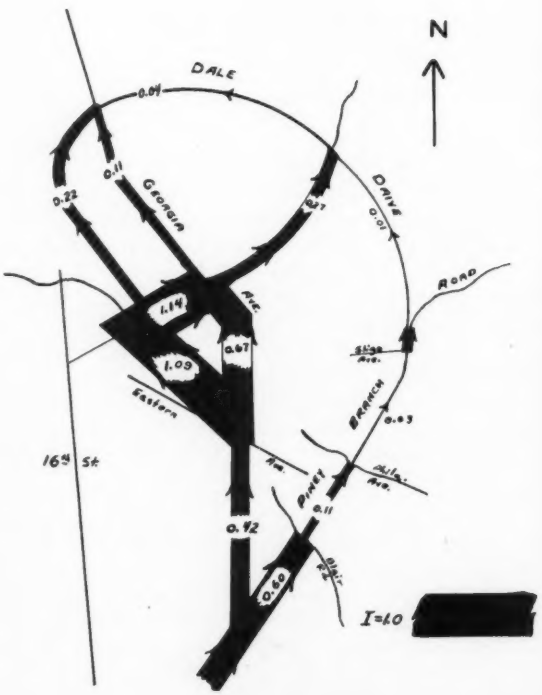

Fig. 4
Route congestion as summarized graphically by the Clifford Point Method.

Figure 4 shows all of the routes as seen by the Point method and is included only to show what can be done by graphic presentation of most of these methods.

(Continued on page 256)

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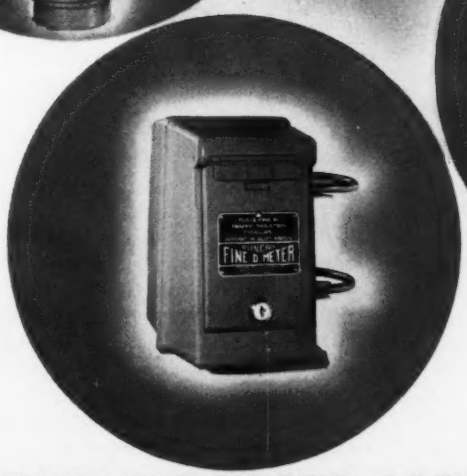

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Freeway System of Benefits

Robert S. Henderson, Civil Engineer

City Street and Freeway Design Division, Los Angeles, California

Introduction

SINCE THE PUBLICATION in "TRAFFIC ENGINEERING" in December 1953 of the article "The Economy of Freeways," by Lamar W. Gardner (ITE), subsequent studies have been made in the Los Angeles City Bureau of Engineering, under the direction of Mr. Gardner, relative to the benefits accruing to the motorists when using a grade separated freeway as compared with a conventional city street. The results of these studies, summarized herein, were published in September 1954 under the title "A Study of Freeway System Benefits."

The "cost-benefit ratio" derived from this study may be used as a yardstick for comparing the immense value of these highways with their correspondingly high first cost. In November 1955 a report was made to the Joint Interim Committee on Transportation Problems of the California State Legislature. In this report the cost-benefit ratio was used to demonstrate the need for certain freeways proposed to be added to the State Highway System. The cost-benefit ratio is also valuable in assigning priorities of financing to units of a freeway system under progressive construction.

Because of differing operating costs and benefits of private and commercial vehicles, the ratio of expected commercial usage is important. In estimating this ratio for individual freeway sections, the effect of present and anticipated land use should be considered. The probable diversion of truck traffic to the proposed freeway due to more favorable grades and alignment, as well as the types of trucks involved, should be appraised as carefully as possible.

In the illustrations used herein, the existence of a competing surface road of equal length has been assumed. Probably, competing surface routes will be of greater length; if so, the total operating cost over the difference in mileage should be added to the accumulated savings.

A table of benefits to motorists traveling freeways in lieu of surface streets, contained in the 1954 report, follows:

MINIMUM BENEFITS TO MOTORISTS USING FREEWAYS

Average Savings per Vehicle Mile

(1) Gasoline Savings	0.33c
(2) Maintenance Cost Savings due to elimination of stop-and-go travel	0.24c
(3) Accident Savings	0.56c
(4) Time Savings (commercial vehicles only)	0.87c
TOTAL	2.00c

The above benefits do not include the time savings to private passenger vehicles. Time savings to light commercial vehicles were pro-rated to all vehicles to obtain an average saving for all vehicles.

Benefits to passenger cars for fuel, maintenance, and accident savings, excluding time savings, amounted to 1.12c per vehicle mile in the above table, as compared to 1.13c quoted in "The Economy of Freeways" (TRAFFIC ENGINEERING 1953). This furnished a check, since the studies are based on independent data. A recent publication of the Automobile Club of Southern California, titled "An Appraisal of Freeways vs. Surface Streets" stated that test runs on the 45 miles of freeways existing at that time, and on parallel surface streets in the Metropolitan Area, found fuel savings to be 0.53c per vehicle mile for the average passenger car. This indicates that our latest figures are conservative.

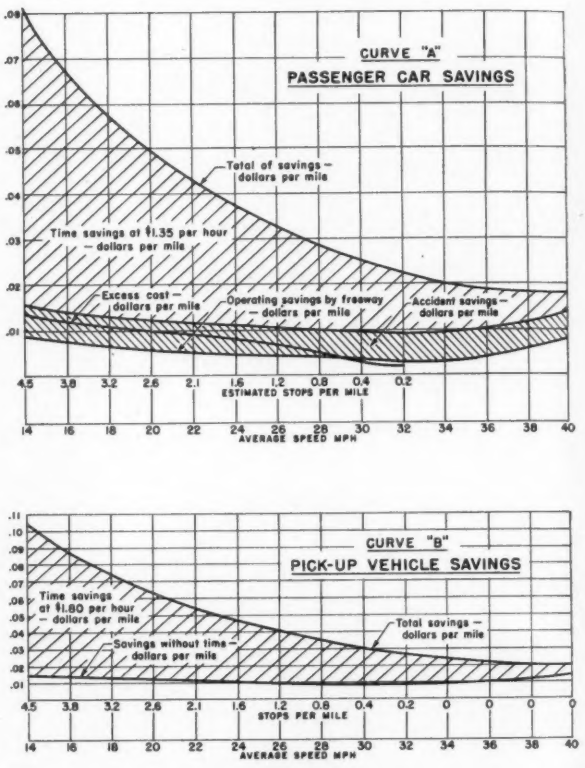

CURVE "A"
PASSENGER CAR SAVINGS
Total of savings — dollars per mile
Time savings at $1.35 per hour — dollars per mile
Excess cost — dollars per mile
Operating savings by freeway — dollars per mile
Accident savings — dollars per mile
ESTIMATED STOPS PER MILE
AVERAGE SPEED MPH
CURVE "B"
PICK-UP VEHICLE SAVINGS
Time savings at $1.80 per hour — dollars per mile
Savings without time — dollars per mile
Total savings — dollars per mile
STOPS PER MILE
AVERAGE SPEED MPH

Fig. 1
Savings for passenger vehicles and pick-up vehicles using freeways as compared with conventional streets.

In previous studies made by this office, the time saved by the passenger car was not considered, since first costs were amply justified without; however, in comparing the comparative values of individual freeway projects, time savings of the passenger car should be included to compensate for different ratios of commercial use. Later in the discussion a summary of a number of projects selected to compare the justification of a high volume passenger car freeway having a low percentage of trucks, with an industrial freeway having a low volume of passenger cars and a high percentage of trucks is given. Also included in the comparison is a freeway carrying a low volume of both passenger cars and trucks.

Method of Study

The savings of fuel, maintenance, safety, time and accidents were evaluated as direct monetary benefits. The AASHO Committee report sets a value on time savings to the passenger car of $1.35 per hour for a vehicle which has an average occupancy of 1.8 persons. Locally the occupancy of cars averages 1.5 persons per car, and the value of time is $0.90 per hour per occupant, making the time savings per occupant 1½c per minute.

In the article, "The Economy of Freeways" (TRAFFIC ENGINEERING, December, 1953), commercial vehicle time savings were assigned a value of 5c per minute for a representative vehicle. This value was in current use among highway economists at that time. In our new study, truck benefits were analyzed in such a manner that varying benefits could be assigned to individual freeway sections according to adjacent surface conditions. Operational savings for pick-up trucks were assumed to be the same as for passenger vehicles, excepting that $1.80 per hour for drivers' time was used. In order to estimate running cost savings for commercial vehicles, information on operating costs of trucks was obtained from studies made by the California Public Utilities Commission. Values for 2-axle and larger trucks were computed from constructive mileage allowances for traffic congestion used in rate setting by the State Public Utilities Commission. More detailed information from this source was also secured for evaluation of time savings for trucks of all sizes and for pick-ups.

Truck counts on main highways in this area by axle groupings, with pick-ups counted separately, made possible the application of this data to individual freeways. Volume estimates were made from previously prepared flow maps, traffic estimates, and screen line counts. Estimated length of freeways, together with the estimated volumes, provided estimates of annual vehicle mileage on the various freeway sections, which were then expanded to cover a 20-year period of growth. Annual benefits per mile of freeway were calculated for average mileage use, and then compared with the estimated cost of the freeway section.

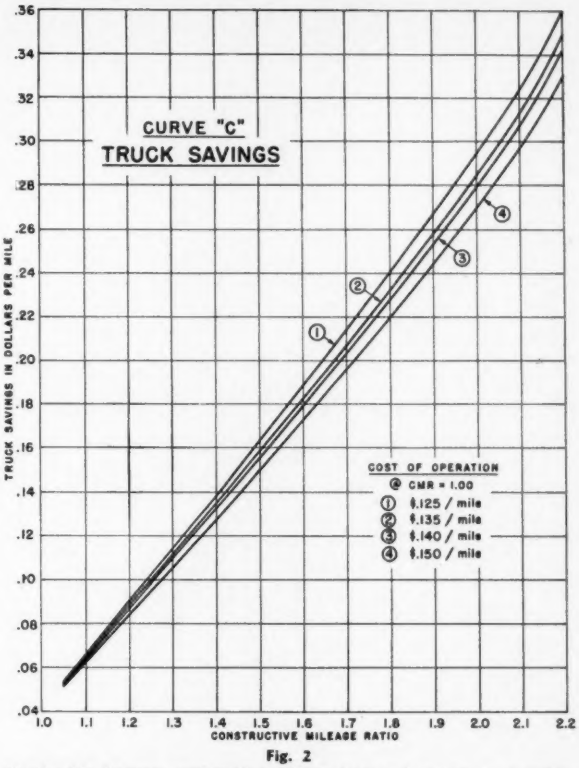


Fig. 2

Relationship between constructive mileage rates and savings in operating cost for four representative truck types.

Procedure of Study

To determine total benefits it was first necessary to establish a unit value for the savings made by a typical vehicle using a mile of freeway instead of a mile of surface street. Our previous study included time savings to commercial vehicles and divided these among all vehicles, resulting in a figure for an average vehicle. This was some-

TABLE 1-a—TYPICAL FREEWAYS & BENEFITS
Descriptive Data

Length (Miles)	*Estimated Cost*	*Average Daily Volume*	*Average Per Cent Commercial Use: Trucks*	*Pickups*	*Freeway*
10.9	$26,900,000	40,000 to 65,000	17	5	GOLDEN STATE FREEWAY (Burbank Blvd. to Sepulveda Fwy.)
17.9	$85,400,000	30,000 to 90,000	11	8	INDUSTRIAL FREEWAY (Santa Ana Fwy. to Willow St.)
12.0	$79,160,000	112,000 to 138,000	3	4	VENICE FREEWAY (Harbor Fwy. to Ocean Fwy.)
9.5	$66,400,000	37,000 to 50,000	4	5	VENTURA FREEWAY (Golden State Fwy. to Foothill Blvd.)

TABLE 1-b—TYPICAL FREEWAYS & BENEFITS
Average Annual Benefits (Thousands of Dollars)

Freeway	*Pass. Cars*	*Trucks*	*Pick-ups*	*Total*	*Cost/Benefit Ratio*
GOLDEN STATE FREEWAY (Burbank Blvd. to Sepulveda Fwy.)	4,440	3,151	400	7,991	3.4
INDUSTRIAL FREEWAY (Santa Ana Fwy. to Willow St.)	12,970	4,444	1,676	19,090	4.5
VENICE FREEWAY (Harbor Fwy. to Ocean Fwy.)	19,883	2,500	1,027	23,410	3.4
VENTURA FREEWAY (Golden State Fwy. to Foothill Blvd.)	6,058	593	349	7,000	9.5

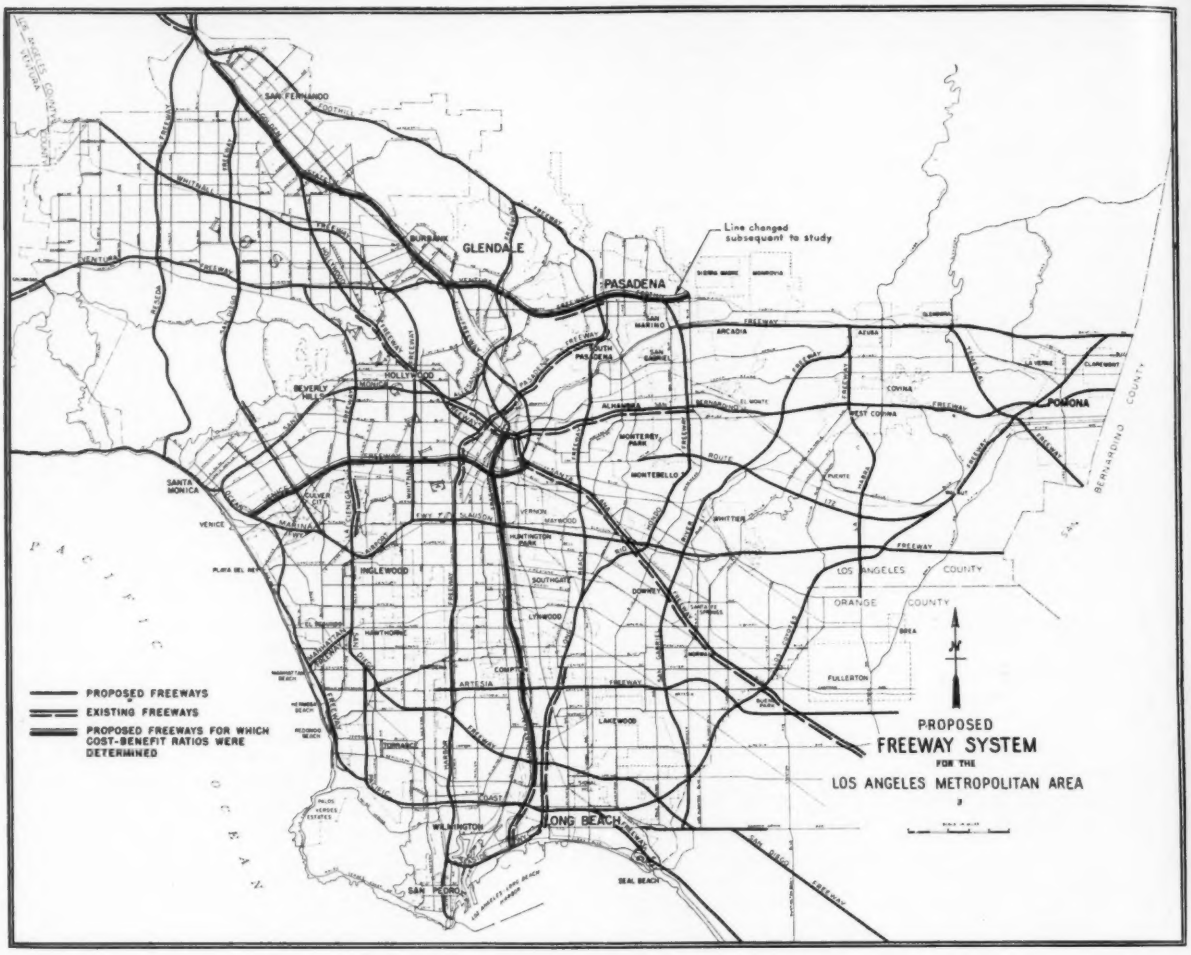


Fig. 3
Proposed freeway system for Los Angeles Metropolitan Area.

what high for passenger vehicles and low for commercial vehicles, where time is vitally important and where operating expenses are large. The California Public Utilities Commission supplied considerable information dealing with their rate setting methods, and this was used as a basis for the commercial vehicle savings presented in this study.

Savings for passenger vehicles using freeways as compared with conventional streets have been itemized and plotted on Curve A of Figure 1. This curve is based on local speed and delay studies, the 1952 AASHO report "Road User Benefit Analysis," and our previous studies. Time savings were taken as $1.35 per vehicle hour, and accident savings at $0.006 per mile.

Curve B shows "pick-up" vehicle savings, and differs from Curve A only in the value of the drivers' time, which was conservatively assumed to be $0.03 per minute.

The savings in operating cost for heavier commercial vehicles were proportioned according to the constructive mileage ratio, as established for the competing parallel route by the California Public Utilities Commission for use in setting truckers' rates.

The general theory of constructive mileage is that total operating cost is approximately inversely proportional to the difference in speed over the section in question, and the speed over a section with no conditions to interfere with traffic.

Through mutual agreement of the State and truckers an average operating speed on level road was set at 23.5 mph, and an average operating cost per ton mile at this speed was calculated. Then, by dividing the total transportation cost per ton mile at various speeds between 4 and 23.5 mph, a plot of cost vs. speed was made, and the equation of the nearly parabolic curve developed was

$$\text{CM Ratio} = \frac{(23.5 - \text{mph})^2}{200} + 1$$

In our studies the constructive mileage ratio of freeways has been assumed to be 1.00. Curve C of Figure 2 shows the relationship between constructive mileage ratio and savings in operating cost for four representative truck types.

Truck accident savings were conservatively assumed to be the same as for passenger vehicles, i.e., $0.006 per mile.

Descriptions of the Typical Freeways Studied

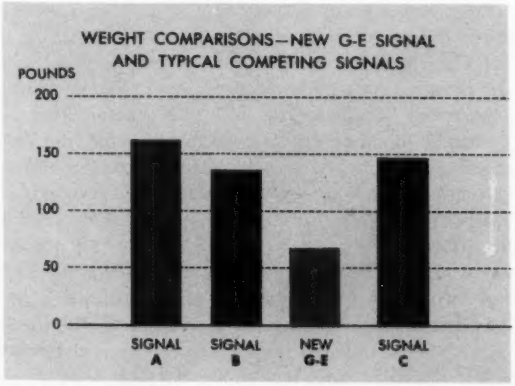
Golden State Freeway

The section of the Golden State Freeway between U.S. 99 junction near the City of San Fernando and the Ventura

(Continued on page 256)

G.E.'s new aluminum Signal

Lightest by far, but still the most rugged. Fast and economical to install, too!



COMPARISON SHOWS that the new G-E aluminum signal is less than half the weight of its lightest competitor. Chart based on comparison of 3-color, 4-way, adjustable span-wire suspended signals.

Actually 45% lighter than existing models—and a major step forward in simplified, functional design! Here's one of the greatest advances in traffic control equipment that the industry has seen for years—the all-new General Electric lightweight traffic signal!

LIGHT WEIGHT means quicker, safer, easier installation on busy intersections—saves money, too, since there is less need for heavy, costly poles and span wires. Design provides for minimum use of tools—sections may be added or removed easily, rotated 90 or 180 degrees and locked in place with only one bolt. Snap-on door and lens assemblies simplify and lessen your maintenance problems.

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Traffic Engineering in the Ontario Department of Highways

By Walter Q. Macnee (Assoc. Mem., ITE)
Traffic Engineer

and

Grant A. Bacchus (Jr. Mem., ITE)
Route Analysis Engineer, Ontario Department of Highways, Toronto, Canada

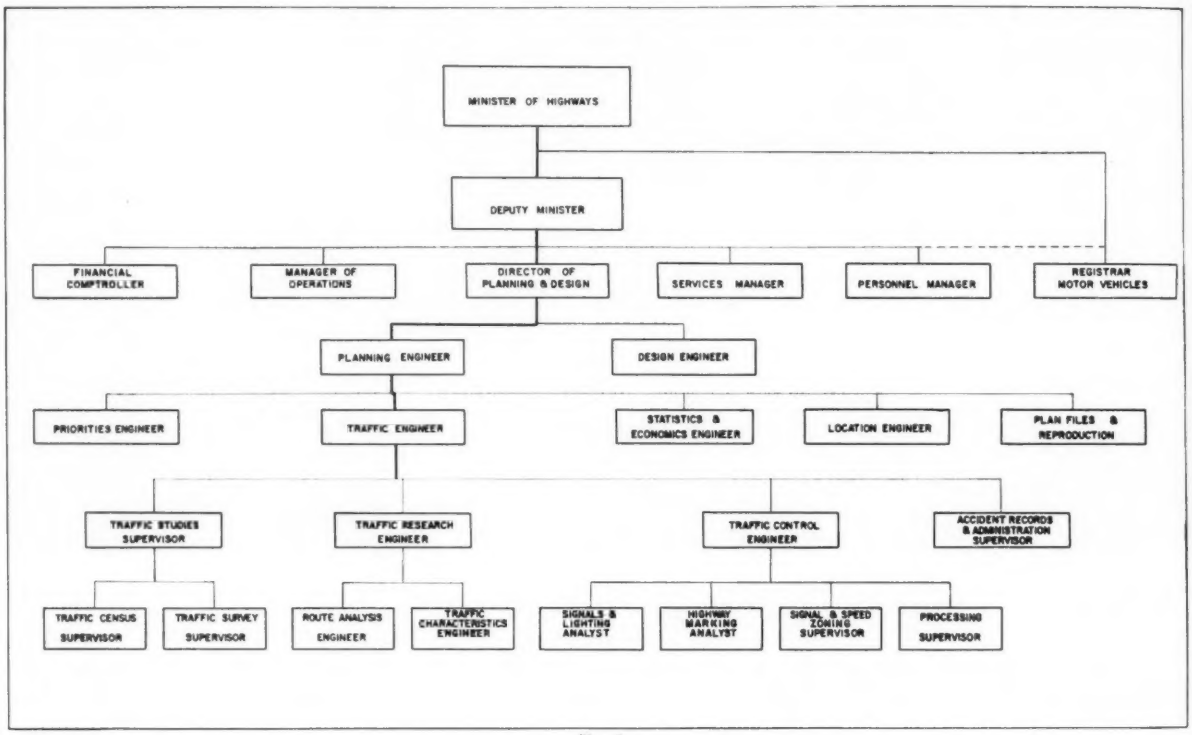

Fig. 1
Organization Chart of the Ontario Department of Highways.

Introduction

THE PROVINCE OF ONTARIO is one of the oldest provinces in the Dominion of Canada, having been formed at the Confederation of 1867. It has an area of 412,582 square miles of which 49,300 are water and a 1955 population of over 5,000,000, which is one-third of the population of Canada. Wholly owned and maintained by the Province of Ontario and administered by the Ontario Department of Highways, the Province has over 8,000 miles of main highways called King's Highways of which nearly 300 miles are four-lane controlled access highways and over 2,600 miles of excellent secondary roads. In addition to the above, there are over 70,000 miles of other roads in Ontario which are owned and maintained by County, Township, or Urban authorities. In 1955 the motor vehicle registration was over 1,600,000.

Organization

As can be seen in the overall organizational plan of the Ontario Department of Highways, the Traffic Engineering Section is a part of the Planning and Design Branch, and is answerable directly to the Planning Engineer. Traffic engineering inevitably overlaps between the planning and operational aspects of highways and it is problematical whether the Traffic Engineering Section should be placed with the Planning Branch or with the Operational Branch. In the case of Ontario it has been located with the Planning and Design Branch primarily because the services performed for the Operations Branch are of an advisory nature only.

To handle the multitude of tasks placed before the Traffic Engineering Section, the section has been subdivided into four groups. The first group—called the Traffic Studies Group—is responsible for all field work; the second—called the Traffic Research Group—is responsible for all planning phases of traffic engineering; the third—called the Traffic Control Group—is responsible for all operational aspects; and the fourth—called Accident Records and Administration Group—is responsible for all the non-engineering aspects.

An outline of the functions of these various groups follows:

TWO-GUN TOUGH GUY

Model 16 Reflecto-Liner

Here's the highwayman that steals all the honors in striping machine production, maneuverability and price. Constantly holds up an air supply equal to 200% of gun requirements.

Air-activated elbow traction insures a positive, equalized driving action.

This rugged performer chews up the miles and spits them out in single or twin reflective ribbons of unvarying perfection. . . . beacons to guide the motorist safely to his destination.

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Don't be roped in on an inferior striper. Make sure your brand is WALD.

REFLECTO-LINER MODEL 16

WALD INDUSTRIES, Inc.

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Traffic Studies Subsection

This group is responsible for practically all of the field studies that must be made. The only office work in connection with this group lies in administration and in checking the adequacy of the various techniques used. There are two units in the group, one of which handles the continuing functions, such as the volume census work; while the other handles such special studies as Origin-Destination Surveys.

The major work of the continuing functions group is the volume census work. To adequately supply the volume census data we have utilized three different counting techniques. In the first instance we have the permanent station counter, which hour by hour gives us a year round record of all traffic at a specific point. These stations, of which we currently have 11, are maintained on at least one of each of the various types of highways in the province. They provide an accurate appraisal of the day to day variations in traffic and provide also the year to year variations thereby giving us annual trends in traffic growth and the basis for future projection of traffic volumes.

These permanent stations are augmented by some 80 semi-permanent stations that are operated for 5 days each month. The data from these semi-permanent locations provide somewhat the same data as do the permanent stations but obviously the results do not have the same degree of accuracy.

In addition to the previously mentioned counting stations, we also take coverage counts at some 2000 other locations. At these coverage points we count the vehicles for a 24-hour period once a year.

The combination of the above three methods allows us to estimate traffic volumes within an accuracy of 15% at any point on the King's Highway system. These estimates can be reasonably well projected into the future, providing that nothing unexpected happens to disturb the economic conditions of the area under consideration.

To handle this work we keep 5 field men busy year around utilizing the following equipment:

14 Permanent counters with magnetic detectors.
1 Electric Eye.
35 Portable automatic traffic recorders.
75 Cumulative counters.

The field data from this survey is turned over to the Characteristics Group for processing.

The major work of the Special Surveys group is in connection with Origin-Destination Surveys. For this work we utilize university undergraduates, usually from Arts Courses. This summer staff often amounts to 30 men. These summer employees are split in survey parties of 9 men each,—1 party chief, 1 vehicle classifier and 7 interviewers. The full description of an Origin-Destination survey lies outside the scope of this paper, but in essence the system we have used is the roadside interview where a selected sample of motorists is questioned as to their trip origin and destination, the purpose of the trip, and the routes that have been used in travel. Another question asked is with respect to intermediate stops as this is often necessary to explain an otherwise uncodable trip. When time will permit we usually interview all vehicles in each direction for a period of 16 hours. On some of the more heavily travelled roads we are forced to interview for 24 hours to ensure an adequate sample. During the period 1950-1955 about 500,000 interviews were taken and we have enough statistical data to indicate that the taking of as small a sample as 25% of the traffic will provide reliable data.

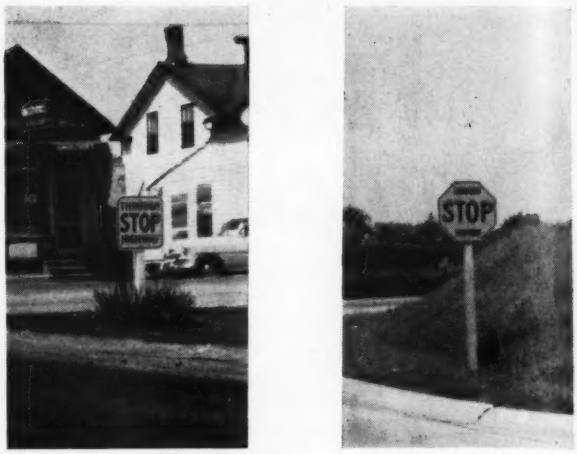


Fig. 2
The photograph on the left shows the 24" x 24" rectangular black on white stop signs used prior to the new standards. The photograph on the right depicts the new 24" x 24" octagonal black on yellow stop signs. Regulations are now being prepared to change this sign to a white on red color combination.

Further study of the sampling techniques are currently underway by the Ontario Joint Highway Research Project.

Traffic Research Subsection

The Traffic Research subsection is responsible for developing the collected field data into a useable form, and providing technical advice to the functional design section regarding the amount and type of traffic for which provision must be made. In addition to this, this group is expected to conduct practical research projects to determine, from a traffic operational standpoint, the effectiveness of the various design criteria currently in use in the province.

To handle this work there are two Groups:

(1) The Traffic Characteristics Group and
(2) The Route Analysis Group.

The Traffic Characteristics Group is responsible for determining the general patterns of traffic on the various segments of the King's Highway System. Among the information that the group prepares are:

(1) Annual Average Daily Traffic Volumes
(2) Design Hourly Volumes
(3) Hourly, daily and seasonal variations
(4) Trends in traffic growth and future projections
(5) Speeds and speed trends
(6) Vehicle classification by types
(7) Driver observance and their behavior patterns

The Route Analysis Group provides the design data required for all design and redesign. The major "tool" at their disposal is the information developed from the Origin-Destination surveys. Consequently they handle all the office work in connection with these surveys. This work includes the coding of the field data, and punching this coded data on cards so that machine sorting is possible. The coding method used is relatively simple. For locations in the province we use a 4 digit code. The first digit indicates a general region, the second digit approximates a county, the third digit specifies a township and the fourth digit indicates a specific location within the township. With a coding system of this nature trip cards can be sorted either on a finite locality basis or on a regional basis. This method has proven its worth on numerous occasions.

Since Origin-Destination data is the only data that can be used with any degree of accuracy when attempting to de-

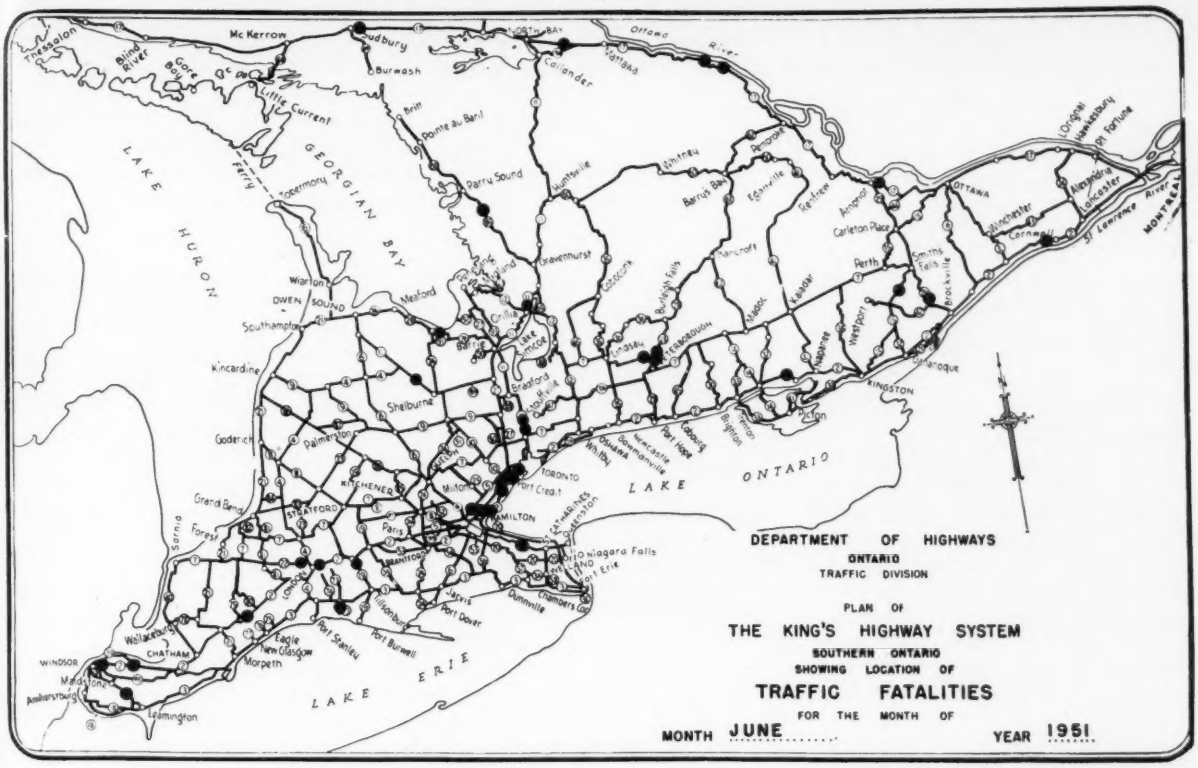


Fig. 3
Typical fatal accident spot map prepared by the Accident Records Sub-section.

termine the amount and character of traffic to be expected on a proposed new route we use these data to determine, within reasonable limits the potential volumes and turning movements on proposed new highways in the province.

This group is also equipped to obtain turning movement data at existing intersections and project these turning volumes into the future, so that the design division can redesign the intersection to handle the expected volumes of the future.

When a traffic analysis is required for a special purpose, the traffic research group will handle the study. For example, the group reports the effect of new shopping centers, drive-in theaters, etc., on the traffic using the servicing artery, and makes recommendations concerning the granting of permits.

Traffic Control Subsection

When a request for a traffic control device is received by the Department of Highways, it is usually forwarded to the Traffic Engineering Section for a traffic analysis and recommendation. To handle this, the Traffic Control subsection has been organized. The section has developed warrants to determine the economic feasibility of traffic signals and flashing signals.

In the case of traffic signals the warrants used are an adaption of those outlined in the manual on Uniform Traffic Control Devices (AASHO).

The warrants for flashing signals are perhaps the simplest even though they result in the most heated disputes. It is the contention of the Traffic Section that flashing signals should only be used when there is an obstacle in the roadway, such as a medial island, or where an important intersection is obscured by an abrupt change in alignment or by a sag in the road profile.

Recently Ministerial approval has been given to the adoption of the color coding system for signing. In this, red is reserved for all Stop Signs, yellow (or amber) for warning signs and green for the signs (direction signs).

The traffic control group handles the design phases of signs, pavement markings and speed zoning. They have just completed a Uniform Sign Manual and are currently working on a pavement marking manual.

Accident Records and Administration Subsection

This section handles all the non-engineering work of the Section, including the typing, drafting and general clerical work.

Perhaps the most important phase of the work is the Accident Records Group. The Provincial Police are required to supply the Ontario Department of Highways with a duplicate copy of every report on an accident on the King's Highway System. These duplicate copies are then forwarded to the Traffic Section where a location file is maintained. As a result of this filing system we are able to give the complete accident experience for any specific point on the highway system in a matter of minutes. The uses to which this accident data can be put are almost limitless. Every traffic analysis is accompanied by a search of the accident records since these records often point out whether a deficiency exists in the roadway. To bring the accident records to a common basis we prepare annual accident rates. The accident rates are watched carefully, and when the rates for a particular section are found to be consistently higher than the average rate for the whole highway, for a period of at least three years, the section is considered as being an Accident Prone Location. The Traffic Research Group is then notified and a

study is made of the location to determine whether there is a structural defect or an inadequate design element in that section which is contributing to the cause of the accidents. If the fault can be found then appropriate action can be taken.

Summary

To handle the above mentioned functions the Traffic Engineering Section currently employs a staff of 42. Included in the staff are six engineers, four of whom are members of the Institute of Traffic Engineers. More engineers could easily be absorbed into the section, however, trained traffic engineers are simply not available at the present time. It is hoped that such projects as the traffic training course offered by the Ontario Traffic Conference and the proposed Ontario Joint Highway Research Project will tend to alleviate the shortage of qualified engineers for the traffic field.

THE MEASUREMENT OF TRAFFIC FLOW

(Continued from page 246)

Conclusions

As was stated in the introduction, this study was undertaken to determine a method of congestion rating to be used in establishing a priority system for traffic improvements. The opinion rating has little value in this type of program and should only be used as a preliminary estimate of the situation. The National Committee Vehicle Delay Rate and the Greenshields Efficiency rating appear to be ideal methods for appraising the efficiency of the street system in general but do not point out the really deficient areas.

The National Committee's Delay Rate does not have the apparent accuracy of the Greenshields Quality of Transmission in less congested areas. The Delay Rate does however rate the worst routes with reasonably good accuracy and has the advantage of simplicity to recommend it. The Quality of Transmission is more stable but has the disadvantage of being difficult to compute since extensive field measurements must be transcribed before the simple formula can be applied.

The Easy Method has only simplicity as an advantage over the other systems which were used. It can be applied best to routes with high density but should be applied with caution on other streets. The Clifford Point Method also can be used with some confidence in densely developed routes. Here also, caution should be used if the method is applied in free-flowing areas.

The results of this study indicate that the National Committee's Delay Rate is the best "deficiency" method of street service rating of those discussed here and the Greenshields method should generally produce the best "efficiency" rating. For simplicity in rating Central Business Districts, the Point Method has proven satisfactory.

FREEWAY SYSTEM OF BENEFITS

(Continued from page 250)

Freeway is a portion of the major north-south State Highway truck routing. Average volumes will be moderate, with heavy commercial use, including over-the-road trucks. Cost-benefit ratio is 3.4.

Industrial Freeway

The section of the Industrial Freeway between Santa Ana Freeway in Los Angeles and Willow Street in Long Beach provides an important truck route between the Central Business District, Central Industrial Area and Long Beach-Pacific Coast Highway. It is a close-in easterly bypass of the Central Business District. When connecting with Golden State and Ventura Freeways it provides a major north-south artery on a Statewide Primary Highway System. Average volumes vary from moderate to heavy. The cost-benefit ratio is 4.5.

Venice Freeway

The section of the Venice Freeway between the Santa Ana Freeway and Ocean Freeway in Venice provides a southerly bypass of the Central Business District to Venice and Santa Monica.

The section under study runs from Harbor Freeway to Ocean Freeway. Average volumes will be heavy. Cost-benefit ratio is 3.4.

Ventura Freeway

The section of the Ventura Freeway between the Golden State Freeway and the easterly side of Pasadena forms the connecting link of a major east-west Countywide highway bypassing central Los Angeles. Average volumes will be from light to moderate. The cost-benefit ratio is 9.5.

This article has discussed only the benefits to the motorist. However, there are benefits to the community which all residents will realize from the freeways. As an example, the total cost per hour for operating a gravel truck at an average operating speed of 23.5 miles per hour would be $5.80. Assuming an average operating speed of 40 mph on a freeway, the equivalent cost of operation is:

$$\$5.80 \times \frac{23.5}{40} = \$3.40 \text{ per hour}$$

when using a freeway rather than a conventional street. This is equal to a savings of $2.40 per hour to be passed on to the consumer.

Other advantages derived from the freeway system and not readily evaluated in terms of money are the comfort and convenience of such a system, and the reduction of congestion on the surface system as the result of the large amount of high speed, through traffic diverted to freeways.

Other benefits include the stabilization or enhancement of property values, doubling of the practical radius of real estate development on a travel time basis, the improved access to recreational or cultural facilities, increased mobility in times of disaster emergencies, increased tourist travel, and reduction of the strain of driving.

Since the completion of the studies of the four freeways described, traffic counts on existing freeways have continued to soar. Counts on the Hollywood Freeway in excess of 180,000 vehicles per day have been made, although 90,000 vehicles per day was assumed during design. Traffic exceeds 1500 vehicles per hour per lane for nine hours of the day. At times traffic exceeds 2200 vehicles per hour per lane.

Under these emergency conditions, which should be relieved when more of the component freeways of the system are completed, a single accident or disabled vehicle may upset the operation of the entire freeway.

If a freeway were assumed to operate under such overload conditions, the results of our studies would have to be modified. It is likely, though, that the cost-benefit ratios would not be increased, since the increase in traffic would affect the competing surface route as well as the freeway.

Use of Neon Highway Signs

By A. M. White (Mem., ITE)

Traffic Control and Safety Engineer, Mississippi State Highway Department
Jackson, Mississippi

IN MARKING AND SIGNING a highway system, innumerable conditions are encountered which are not standard and are not covered in the manuals. It is seldom that two locations are exactly alike and few locations are similar.

The manual on "Uniform Traffic Control Devices for Streets and Highways" is an excellent guide towards uniform marking and it is followed as closely as possible in Mississippi; however, at some locations, the standards are not flexible enough to meet all existing conditions.

Several years ago trouble was experienced in the City of Jackson due to the fact that motorists became lost at an intersection within the city. The urban routing of U.S. 51 extended along an eight-lane undivided street which led to the top of a hill where the route turned left into a four-lane street. The intersection is in the shape of a "Y" and is signalized. The major trouble was the fact that traffic continued straight ahead into a residential area instead of turning left. Over-sized route markers and advance turn signs were tried without success. A neon sign was designed in the shape of the standard M-101 shield with a left arrow in the shape of the standard M-110 on the same face. This sign was purchased for $45 from a local neon sign company and was suspended on the messenger cable to the right of the traffic signal. As soon as the sign was installed, the trouble ceased. Maintenance was continued on the standard advance signs and other markings.

On U.S. 90 between Gulfport and Bay St. Louis, there is an operpass over the L & N Railroad at Henderson Point. Prior to August, 1953, there was a 90° turn at the north end of the overpass with a radius of approximately 150′. The roadway width on the overpass was 42′ and it reduced in the turn to 20′. The sight distance leading to this turn was less than 600′ and the approach speed varied from 30 mph to 80 mph. Of course, there were accidents. Large barricades were placed on the outside of the curve and delineators were placed on the outside throughout the length of the curve. In advance of the curve and overpass, several "SLOW TO 20" and turn signs were erected, but these did not perform the functions planned since accidents continued. Pavement markings, flashers, and other devices were tried without success. It was decided to try a neon sign over the roadway at the top of the overpass.

A sign 11′ long and 32″ high was designed. Painted on the face of the sign was a large left arrow and the word "SLOW." The arrow and word "SLOW" in 18″ letters were painted white on a black background. The arrow had an outline of red neon that burned constantly. The word "SLOW" had white neon letters and burned alternately with the "TURN"; the latter was superimposed over the "SLOW" in red neon. A two-circuit flasher caused the "SLOW" and "TURN" to alternate. This sign was purchased for $195. The bridge is on a vertical curve and the sign was suspended 16′ above the roadway on a mast arm. It was placed just over the top of the vertical to enable vehicles approaching on the upgrade to look straight into the sign.

Fig. 1
Overhead neon sign on U.S. 51 through Terry, Mississippi. Until the neon sign was installed there were one or two serious accidents per month, while for the three-year period after installation there has been a total of only two accidents.

This sign was in use approximately two years prior to the time the turn was torn out and a new road constructed. During this period only one accident was reported at the curve. (The driver is reported to have been under the influence of intoxicants.) Similar signs were installed on both approaches in advance of an 88° curve on U.S. 51 at Terry where accident record studies revealed one to two serious accidents occurring per month. (See Figure 1.) Within three years, since installing the signs, only two accidents have been reported on the curve.

When the new road was constructed at Henderson Point on U.S. 90 and the curve eliminated, the sign was taken down and erected in advance of a 12° curve near Laurel. The approach was through open country and the roadway straight and level. In this case the use of flashers and delineators reduced the accident frequency but not as drastically as did the addition of neon. The ease in which the sign can be erected or taken down indicates a useful characteristic in that it could be placed at hazardous locations awaiting reconstruction and then be salvaged when the new road was completed.

Another desirable application was found at locations where highways are being constructed as an ultimate four-lane facility which necessitates a transition from a two-lane to a divided four-lane. Some locations require that the transition be made from the left lanes to the right two lanes. At these points, it is usually the practice to build a temporary transition surface and the problem arises of attempting to lead traffic from the permanent pavement onto a temporary surface. At such locations, difficulties are encountered with traffic continuing into wrong lanes and severe accidents occur. Following the unsuccessful use of standard advance warning signs and flashers, a neon sign with arrow and flashing "KEEP RIGHT" was suspended over the roadway. This sign

Fig. 2
Successful use has been made of overhead neon signs at locations where a two-lane highway connects with a four-lane divided highway as shown in the photograph above.

was erected 500′ to 700′ in advance of the transition and proved effective. (See Figure 2.)

An advantage of the neon over standard reflectorization methods was demonstrated in urban areas where lighted business signs are competitive to any highway marking program. This type sign was also designed in the shape of a route marker and used successfully at a clover-leaf intersection in the business area of Jackson. To date vandalism has remained small.

It is not the purpose of this article to advocate the use of neon signs, nor is it intended to leave the impression that Mississippi is plagued with hazardous highways. The system of this State consists primarily of high speed good highways and the locations cited are exceptions that confront the driver unexpectedly. It is realized the signs used did not conform to the uniform manual but were erected after exhaustive use of standard markings had failed.

Advertising companies use various means of commanding the drivers' attention; therefore, it is felt that much can be learned from them in the field of traffic control.

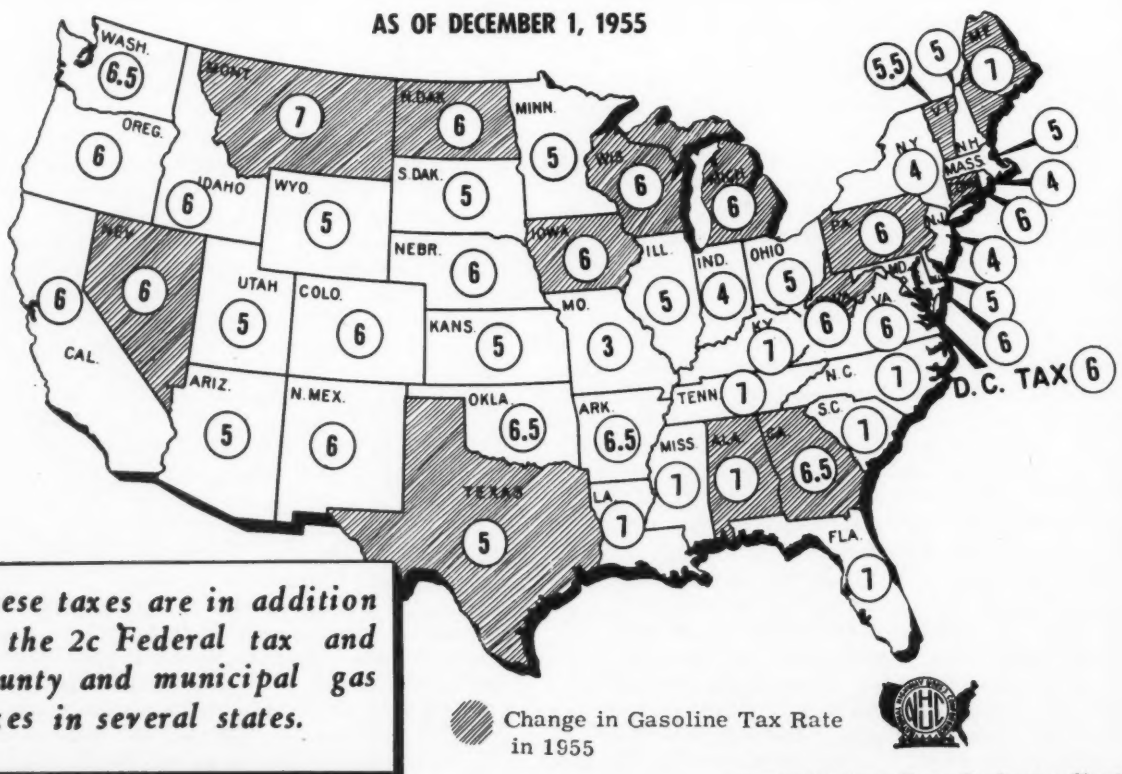
PLEASE

PATRONIZE

OUR ADVERTISERS

STATE GASOLINE TAXES

AS OF DECEMBER 1, 1955



These taxes are in addition to the 2c Federal tax and county and municipal gas taxes in several states.

Change in Gasoline Tax Rate in 1955

National Highway Users Conference Chart

Fourteen states provided for increased gasoline taxes in 1955. Present state gas tax varies from 3 cents per gallon in Missouri to 7 cents per gallon in ten states with 5.8 cents per gallon being the overall average. Of the fourteen states with a gasoline tax of 6.5 cents per gallon or more, eleven are located in the southeastern portion of the United States.

TRAFFIC NEWS

Traffic Engineering Fellowships at Yale Announced

The Yale University Bureau of Highway Traffic has announced the availability of fellowships in its Traffic Engineering course covering the next academic year of study starting September 17.

The course of graduate study is devoted to the planning and operational design of new streets, highways and terminals as well as to the regulation and control of traffic movements on existing facilities in the interests of safe, convenient and economic transportation of persons and goods.

The fellowships are to be awarded on a competitive basis to applicants who are residents of the continental United States and are graduates of an accredited school in engineering. A number of tuition scholarships are also available.

The fellowships, which offer up to $2000 each, are as follows:

Automotive Safety Foundation Fellowships—Applicants should have had practical experience in city or state highway engineering, or in related fields. Preference will be given to those applicants who are now employed in street and highway engineering and who secure a leave of absence in order to return to their present employer.

Esso Safety Foundation Fellowships—Candidates for these fellowships must be citizens of the following states: Maine, Vermont, Rhode Island, New Hampshire, Massachusetts, Connecticut, New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia, West Virginia, North Carolina, South Carolina, Tennessee, Arkansas, Louisiana, and the District of Columbia.

The James S. Kemper Foundation Fellowship—This fellowship is not restricted to any particular group or region but is available for professionally qualified men desiring to puruse the profession of traffic engineering.

Rand McNally Centennial Fellowship—Applicants for this fellowship must be currently employed by state highway departments or city governments.

Liberty Mutual Fellowship—Applicants for this fellowship must show evidence of aptitude and interest in traffic engineering. It is not required for them to have entered the practice of traffic engineering.

The Bureau of Highway Traffic has been in continuous operation since 1926. In view of the mounting traffic problem and the increasing demand for trained traffic engineers the largest class ever enrolled is anticipated. Graduates of the course are employed by traffic departments of cities, counties and state highway departments; insurance companies, national and local organizations, and other agencies interested in highway traffic.

The closing date of filing fellowship applications is April 1. Those wishing for information and application forms should write the Director, Bureau of Highway Traffic, Yale University, Strathcona Hall, New Haven 11, Connecticut.

Abstract of Past Presidents' Award Paper

The following is an abstract of the Past Presidents' Award paper prepared by Alan Voorhees. The title of the paper is "A General Theory of Traffic Movement" and the entire paper will be published as a separate Institute publication and distributed to the entire membership.

The general theory of traffic movement presented in this paper is based upon the concept that traffic movement in urban areas is related to the interplay between land uses, and is not a by-product of individual land uses. An illustration of this principle is that a shopping area by itself does not generate trips. It is only when the center is near residential areas that it generates trips. Therefore, in evaluating traffic movement it is not enough to analyze individual land uses—consideration must be given to the interrelationship between land uses.

In line with this thesis, recent research has indicated that there is a rather simple way to evaluate traffic movements in urban areas. This approach is based upon one simple principle—that all trips starting from a point are attracted or pulled to various land uses in accordance with certain empirical values. (Table I.) Though much more research is needed to refine these values, suggested indices have been set forth in this paper which will permit one to employ this theory to estimate or predict the frequency and the origin and destination of most trips made in an urban area.

This technique is particularly useful in undeveloped areas for estimating traffic volumes and establishing the street pattern which will be required. Furthermore, since this theory makes it possible for us to understand existing and future urban traffic patterns, it can be most helpful in analyzing present traffic ills as well as guiding future traffic plans.

TABLE I

THE FACTORS APPARENTLY AFFECTING THE DESTINATIONS OF TRIPS STARTING FROM A RESIDENTIAL AREA

Purpose of Trip	*Unit to express "size of attractor"*	*Effect of "distance factor"*
Work	No. of workers employed	$\sqrt{D}$
Social	Dwelling units	D^3
Shopping		
Convenience Goods	Floor area in foods and drugs	D^3
Shopping Goods	Floor area in apparel	D^2
Business	(1)	(1)
Recreational	(1)	(1)
Other	(1)	(1)

(1) In light of existing research it is recommended that these trips be considered as shopping goods trips.

When You Change Your Address

. . . please notify us promptly. Your copies of **"Traffic Engineering"** will then reach you without delay and without interruption.—Traffic Engineering Magazine, Strathcona Hall, New Haven 11, Connecticut.

New Appointments . . .

Barr Joins Florida Road Department

John W. Barr (Jun. Mem., ITE) has recently accepted appointment as Traffic Engineer with the Traffic and Planning Division of the Florida State Road Department. His duties in this position are largely concerned with studies, reports, and recommendations relative to the establishment of traffic control measures and the development of plans for future facilities.

John W. Barr

Before moving to Florida Mr. Barr was a Graduate Assistant on the staff of the Joint Highway Research Project of Purdue University. While there, he was engaged in the performance of traffic and research studies and the fulfillment of requirements for an MSCE degree awarded in January, 1956.

A native of Pittsburgh, Pennsylvania area, Jack first entered Purdue in 1947, his education being interrupted by a year of outside work and two years of Army duty. He first became interested in traffic engineering while an undergraduate doing part-time work on comprehensive O-D surveys conducted by the Joint Highway Research Project and the Indiana State Highway Department.

Jack, Hannah, and three-year-old David enjoy outdoor sports and activities and have become quickly acclimated to Florida. They are looking forward to frequent visits by vacationing friends from the North.

Kaiser Appointed Traffic Engineer in Racine

Fred J. Kaiser, Jr. (Jun. Mem., ITE), was recently appointed City Traffic Engineer of the City of Racine, Wisconsin. Previously Kaiser was on the staff of the Detroit Department of Streets and Traffic.

Fred J. Kaiser, Jr.

Kaiser was born in Youngstown, Ohio, and served for four years as flight radio operator in the Pacific and European theaters during World War II. Upon discharge, he attended Antioch College in Yellow Springs, Ohio, where he received his Bachelor of Science degree. He was employed by the Dayton City Plan Board for one year where he participated in the development of a master plan of thoroughfares for that city. In 1950 he entered the Bureau of Highway Traffic at Yale University and received his certificate in 1951.

Kaiser joined the Traffic Engineering Bureau in Detroit shortly before it was reorganized into the Department of Streets and Traffic. During his four years there, he was assigned to the design division and participated in a great many projects.

Fred's job in Racine is to organize the Department of Traffic and Lighting. This new department has been set up to have charge of the maintenance and operation of parking meters, the instal-

(Continued on page 263)

Lotspeich with City of Spokane

Marvin W. Lotspeich, Jr. was appointed an Assistant Traffic Engineer for the City of Spokane, Washington upon his graduation from the Yale Bureau of Highway Traffic. Since his employment with the city, Marvin has been engaged principally with intersection redesign, the installation of new traffic signals, and the revision of existing traffic signal progression schedules.

Marvin W. Lotspeich, Jr.

Marvin attended high school in Bonners Ferry, Idaho and in 1950 graduated from Washington State College with a bachelor of science degree in Civil Engineering. He attended the Bureau of Highway Traffic at Yale University in 1954-55.

Prior to coming to Spokane he had been employed briefly as an assistant engineer with the Ebasco Services, Inc., and as a Junior Highway Engineer with the Washington State Highway Department. He is a member of the American Society of Civil Engineers and is affiliated with Sigma Tau engineering honorary society. He has an application pending with the Institute of Traffic Engineers.

Marvin is married and has a three-year-old son. His hobby is photography and he also enjoys hunting and fishing at every opportunity.

Hill Accepts New Position

Red Arrow Freight Lines of Texas has named Norman Hill (Affiliate Mem., ITE) as its new Executive Vice-President and General Manager. Hill, 43, has been President of the Capitol Transit Company of Little Rock, Arkansas, since January, 1951.

Red Arrow operates a fleet of more than 400 trucks and trailers, and averages

Norman Hill

almost ten million truck miles a year on scheduled routes serving more than 325 Texas points. The company recently began an extensive program of modernization and expansion, including the addition of thirty new, larger trailers.

Hill brings to Red Arrow an outstanding record in the field of transportation. He is a director of the American Transit Association, and served as President of the Midwest Transit Association in 1952 and 1953. Before his appointment as President of the Little Rock Company, Hill served as Regional Manager for the Southern Division of National City Lines of Chicago and as General Transportation Manager of the Baltimore Transit Company.

A graduate of the University of Colorado and the Henry L. Daugherty training course sponsored by Cities Service of New York, Hill has been extremely active in civic as well as professional affairs.

In Little Rock, he was President of the Quapaw Area Council of the Boy Scouts, Program Chairman of the Little Rock Rotary Club, and a member of the Board of Directors of the YMCA. Other organizations included the Engineers Club, the Explorer's Club, the Riverdale Country Club, the Little Rock Club, and the Institute of Traffic Engineers. Hill is a 32° Mason.

MacDonald Joins Western New York Consultant

Bruce B. Mac Donald (Assoc. Mem., ITE) has accepted an appointment to a position with a Western New York consulting firm effective the first of March. The firm, located in Springville, New York, is owned and operated by Roy E. Pratt, P.E. It is presently engaged in highway design and construction

Bruce B. Mac Donald

supervision, plus highway and land surveying. In his new position Mac Donald will strive to develop traffic engineering work for the firm, as well as participate in the other engineering functions it performs.

A native of Springville, New York, just south of Buffalo, he has resided in Mount Vernon and Yonkers, New York since graduating from the Yale Bureau of Highway Traffic in 1952. Prior to going to Yale he worked in the Buffalo Office of the New York State Department of Public Works as a highway planning engineer. In this capacity he conducted numerous traffic surveys throughout the Western New York area and worked on several urban area reports for cities in that area.

Mr. Mac Donald entered Cornell University in 1946 after spending 3 years in the Army. While at Cornell he was vice-president of the student chapter of the ITE, and president of Algonquin Lodge, the cooperative fraternity where he resided.

Intensely interested in athletics, Hill earned college letters in three sports, and has since been active in Amateur Athletic Union Activities, serving both as an official in AAU-sponsored competition and as a committeeman.

Rice Moves to Corpus Christi

The appointment of Paul W. Rice (Assoc. Mem., ITE), as Traffic Engineer for the city of Corpus Christi, Texas, has been announced by Mr. Russell E. McClure, City Manager of Corpus Christi. Mr. Rice assumed his new position January 1, 1956.

He is a native of Missouri and was raised in Oklahoma. He attended Okla-

Paul W. Rice

homa University where he received his B.S.C.E. degree in 1948. After employment in the Oklahoma City Engineering Department, he entered the Yale Bureau of Highway Traffic, in September of 1948. Upon receiving his graduate study certificate in 1949 he was employed by the city of Tulsa as their first City Traffic Engineer. He organized the Traffic Engineering Department in Tulsa and served as its head until August 1, 1952.

While in Tulsa he was instrumental in the origin, design and usage of the

(Continued on page 265)

From 1952 until his present appointment he has been associated with The Port of New York Authority as Assistant Traffic Engineer and Traffic Engineer II. His duties there included supervision of the sign painting and erection crew; planning and supervision of traffic surveys at tunnels, bridges and airports; geometric design work for intersections, toll plazas and parking lots; plus some traffic signal work.

In addition to his ITE membership he is a Registered Professional Engineer in New York State. His hobbies include bowling, swimming, and horseshoe pitching.

He is married to the formed Nancy Heinzman of Geneva, New York, and the couple have two young daughters.

INSTITUTE AFFAIRS

Todd Leaves ITE to Join Smith Firm

Melville Mansfield "Tim" Todd (Mem. ITE) will join the firm of Wilbur Smith and Associates, 265 Church Street, New Haven, Connecticut on April 1st it was recently announced by Wilbur S. Smith. Todd simultaneously announced his resignation as Executive Secretary of the Institute of Traffic Engineers, a post he

has held for the past four years. Mr. Smith added that his firm was especially gratified at acquiring the benefit of Todd's long and varied experience in highway and traffic engineering.

Mr. Todd will join some 20 other engineers associated with the well known Smith organization, with offices in Columbia, S. C., and Richmond, Va., in addition to the New Haven office. The firm, organized only a few years ago, has furnished consulting engineering services to municipal and state gov rnments, toll authorities, and private organizations in many cities throughout the United States and Canada. It currently holds contracts in such widely scattered places as Miami, Florida; Portland, Oregon; Louisiana; Hamilton, Ontario; Oklahoma; Woonsocket, Rhode Island; Stockton, California; Indiana; Texas; Grand Rapids, Michigan; and many others.

Prior to serving as Executive Secretary of the Institute Todd had a 28-year-long versatile experience with the Virginia Department of Highways, which he first joined in 1924 as a Rodman on a survey party. Working his way up to Chief of Party in 1932 he transferred to the Construction Division in 1938 and a year later was advanced to Resident Engineer in charge of all highway construction and maintenance on a 900-mile system of State Highways in three counties. He was transferred to the Highway Planning Survey in 1943 and became the Highway Department's first Associate Traffic Engineer when the Division of Traffic and Planning was created later that year.

In the nine years which followed until his resignation in 1952, at which time he was responsible for the supervision of warrant application, design, installation, and operation of all traffic control devices outside of cities on the state highways of Virginia, Todd participated in the development of a master plan for Virginia secondary (county) highways, and in the preparation of Virginia's first statewide master plan, "A 20-Year Plan for the Development of Virginia's Highways." He laid out and supervised the project of selecting and establishing Virginia's first Federal Aid Secondary System of 17,000 miles; participated in the planning of a complete centralized statewide punch card accounting system for the Highway Department; directed the detailed preparation of Virginia's first "Manual on Traffic Control Devices," and in 1951-52 the development of a graphic log and punch card system of utilizing highway accident report facts in highway planning and programming.

Todd planned and supervised the installation of the first system of intersection controlled, reversible lane, traffic signals for three lane roads. He delivered papers on this system at the 1949 ITE Annual Meeting and the Highway Research Board meeting in 1951. He was for some years Co-Chairman of the Highway Section of the Virginia Statewide Safety Conference, and in 1952 was a Director on the Board of the Southern Safety Conference.

In addition to membership in the Institute, he is a registered (Virginia) Professional Highway Engineer and a Mason.

The announcement of the appointment of the new Executive Secretary will appear in the April issue

SECRETARY'S COLUMN

I began my first Secretary's Column in the June 1952 issue in the following words:

Last month's issue announced that I had become your new Executive Secretary, but naturally could make no mention of my deep personal appreciation to the Board of Direction and the members of the Institute for their confidence in affording me this opportunity to assume the responsibility.

I have approached the preparation of this first column with misgivings, for it is difficult to put into printed words the various thoughts I would like to convey.

And now after nearly four years I find the preparation of this Column even more difficult than that first one. It is especially difficult for it must be my farewell Column, since my resignation as your Executive Secretary and Editor was submitted to President Prisk the first of this month to become effective March 31, 1956. An opportunity has arisen for me to return to my first love — the active practice of engineering — something that is impossible for the Secretary of a professional society, who must be concerned with the business and minutiae of providing the membership with various services and publications. I am glad that my new opportunity will permit me to maintain a deep interest in both the current affairs of the Institute and its future progress.

Progress of the magazine and the Institute during the past four years has been most gratifying. I have watched the size of the magazine, the number of pages of advertising and the circulation all increase by more than a fifth. Gross revenue of the Institute has gone up 72% and its net worth has increased by 87% to a record $27,174.21. Best of all is the heartening growth of 53% in membership from 627 on May 1, 1952 to the 962 on record March 1, 1956.

My service as your chief executive officer with full responsibility for the Headquarters operations, has provided me a most satisfying experience. It has been a very real privilege to have worked with the various members of the Board and the different Officers I have seen come and go. I shall always

(Continued on page 265)

remember with real affection three members of the original Board that first employed me who have passed on — Messrs. Nick Carter, Ted Matson and Harry Neal.

Whatever success as Executive Secretary I have enjoyed would not have been possible except for the loyalty and hard work of our Headquarters staff to whom I will always be deeply indebted: Miss Anne Leftwich, Office Manager, who has served the Institute so well for nearly eight years; Mrs. J. Edward Donnellan, Secretarial Assistant, with 18 months of service; and Adolf May, Assistant Secretary these past 10 months. And I would be remiss indeed if I failed to acknowledge my indebtedness to Mr. W. John Prince, Vice-President of the Interstate Printing Corporation, who has handled the mechanical production of the magazine and all of our other publications so efficiently these last five years.

Finally, my heartfelt thanks to all of the members, Sustaining Organizations, and to the advertisers and their agencies for the valued support and assistance which have been mine. May you all continue your efforts in helping the Institute to grow and prosper.

M. M. TODD

59 High Street
Guilford, Connecticut

KAISER

(Continued from page 260)

lation and maintenance of traffic signs, signals and pavement markings, and the administration of the city's street lighting program.

Kaiser was married in 1949 and has three children, ages four, two and one week. He was active in the Michigan Section of the Institute of Traffic Engineers and looks forward to a "Jolly" time with the Midwest Section.

ASF Publishes New Book on Parking

Comprehensive findings of recent research on the relation of parking to the urban economy have been compiled in a 64-page illustrated booklet published by the Automotive Safety Foundation under the title, "What Parking Means to Business."

Covered in the booklet are such important aspects as the effect of parking shortage on urban decentralization; the influence of the parking factor on the

(Continued on page 268)

LETTERS TO THE EDITOR

Tulsa Reports on Yield Sign

The City of Tulsa has been using Yield signs since January 19, 1951. This initial installation is still in service. During the first year there were 33 locations using Yield signs. Of this initial number only 5 have been changed to a more restrictive Stop sign usage. These first installations were put in by Paul W. Rice and were of the trapezoid shape, 24″ x 24″, stating "Yield Right-of-Way" in black letters on a yellow background. On these earliest installations an additional panel was added above the sign stating "Slow." At the present time, the City of Tulsa has 190 intersections using Yield signs. As a comparison, there are about 2200 stop controlled intersections.

The public acceptance has been extremely good and we have occasionally received requests for Yield signs rather than for Stop signs. We do not have enough adequate accident information to be of any service. However, our courts and our Police Department are judicious in the enforcement against violators when involved in an accident concerning the Yield sign. Our present ordinance reads "The driver of a vehicle approaching a 'Yield' sign shall slow to a speed of not more than ten (10) miles per hour and yield the right of way to all vehicles approaching from the right or left on the intersecting street which are in the intersection or so close thereto as to constitute an immediate hazard." However, I must point out that in the use of our Yield signs, we have located a few of them on large radius right turns where the speed of merging greatly exceeds the 10 mile per hour limit. This deviation has not been heavily enforced and of course as with many traffic ordinances, would be almost impossible to spell out as an exception. The one serious fault I find with this section of the ordinance is that it does not require the yielding of the right of way to pedestrians as well as vehicles. In some ordinances this may not prove too detrimental since other sections may apply to the pedestrian.

We locate our Yield signs largely in residential areas, especially on collector streets. We have placed the signs in some cases near schools, churches, side streets of business areas, etc. Throughout this widespread usage, we have only had problems around business areas but these problems have not been so serious as to halt our operations where they appear feasible.

One of the major criteria which must be met is one of adequate visibility at the intersection. If visibility is curtailed, we use the Stop sign. Although we use no warrant on volumes, we attempt to hold our Yield signs to areas where the volumes are on the order of 1000 per day.

NORMAN C. BARNETT
City Traffic Engineer
Tulsa, Oklahoma

Multi-Dual Signal Operation

In the February issue there appeared in this column an exchange of correspondence on the subject of master and local traffic signal controllers. The letter below is a continuation of this discussion.

Dear Mr. Schwanhausser:

Here we are again in reply to your letter of December 9, 1955. Your letter was turned over to Floyd Rawlins and he gave his reply much study and thought. His reply is as follows:

"You have stated that combinations such as 60 and 90 second cycles would cause 'false synchronization', but you did not say how this could happen. We simulated a master controller and a local controller on our test board. They were set in every possible position and so far we have not come up with a failure. It would be interesting to hear your explanation on how this could occur.

"Our theory is that the impulse must match on every revolution and if the impulse is not there it will cause the local controller to dwell until it does receive an impulse. So once the 90-second cycle local controllers resets on the 60-second cycle it will cause a 30-second dwell of the local controller a maximum of two times and the third time the 90-second master cycle would release the local 90-second cycle. Therefore, they are in step and will so remain until either a motor failure or another dial change. This maximum dwell of two times is, of course, in lieu of the fact that a third dial does not interrupt which would only cause another dwell of a shorter duration."

Very truly yours,

ALLEN T. HAYES
City Traffic Engineer
Lansing, Michigan

Strictly Business

New Stop Sign of Porcelain-Aluminum

A new red stop sign, made of porcelain enamelled aluminum for greater durability and better daytime visibility; and Stimsonite reflectors for maximum nighttime visibility, has been introduced

by the A'G'A division, Elastic Stop Nut Corporation of America, Elizabeth, New Jersey. With both the panel and Stimsonite reflectors impervious to weather, the new "Lifetime" sign is maintenance-free and will retain the bright legibility of its warning message indefinitely.

Resisting fracture under even severe bends and impact, the Lifetime sign is scratchproof, rustproof and fadeproof. It will require no repainting or treatment with reflective material.

The combination of the porcelain enamel and the Stimsonite reflectors provides a brilliance which results in a message of greater visibility and legibility both day and night.

The reflectivity of the plastic Stimsonite reflectors is built in and cannot be dulled by rain, sleet, snow or heat. Perfect fusion of the porcelain enamel to the aluminum seals in the panel's color against the weather and further reinforces the metal's corrosion resistance.

Albuquerque Reflective Street Name Signs

Since 1946 the city of Albuquerque, N. M., has grown from a town of 45,000 to a city of 165,000 people. Such a growth has created many new streets together with a considerable expansion of developed area. This is particularly so when practically all the homes in Albuquerque are single family residences.

For years the city had been identifying its streets by painting the street names on the curbing at intersections. This type of street marking has several disadvantages. Included among these shortcomings are that they are quite hard to see and over the years are considerably more expensive than permanent post mounted signs.

There were practically no permanent street name signs in Albuquerque so the Traffic Engineering department prepared specifications for as durable a sign as could be had. Samples were requested from sign manufacturers to evaluate the relative qualities of the available materials.

Several tests were conducted to determine the relative qualities of the signs regarding their possible life. It was determined that two porcelain enamel and one baked enamel sign would be the most durable of all the samples tested. It was further determined that a sign designed and fabricated by the city was equal to those submitted as samples.

The sign, prepared by the sign shop of the Traffic Engineering department, was equal in durability, weather and sand blast resistance, and cost. It also had the added feature of being retro-reflective at night. After reviewing the evaluation of the sample signs, the Traffic Engineering department was instructed to make and install 3,500 street name signs.

The legend of the signs consists of silver reflective cut-out letters. The letters were shaped according to the provisions of the Bureau of Public Roads "Standard Alphabets for Highway Signs." The street name was formed with four inch letters. The series of the letter and the length of the sign plate was determined according to the number of letters in the individual street name. The "O" series was used for names with five letters or less. The "A" series was used for names having over eleven letters.

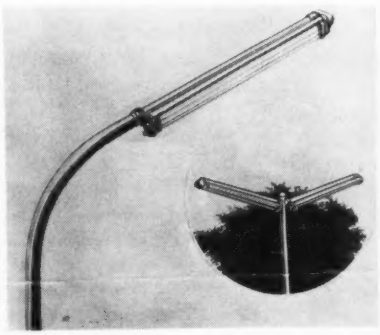
In addition to the street name, the number of the block is placed on each sign using two-inch letters on the left side of the plate. The street designation and quadrant of the city is located on the right side using two-inch and one and one-half inch letters respectively. This legend is placed on a background of black plastic sheet material which is bonded to an aluminum plate. (The letters and background plastic were "Scotchlite" brand reflective sheeting and "Scotchcal" brand plastic film obtained from Minnesota Mining and Manufacturing Company in St. Paul, Minnesota.)

These signs in use today are quite easily read from the traffic lanes. Their reflectorization provides good target value soon enough to locate and read the sign before passing the intersection.

The silver on black color arrangement was chosen to provide the greatest reada-

LUXaire Designed for Better Lighting

A new Pfaff & Kendall fluorescent luminaire is available for use in lighting white-ways, tunnels, underpasses and parking areas.



Designated the LUXaire, the unit features rapid, simple mounting on existing poles, or on companion-designed P & K davits or standards.

Records on existing installations show the P&K LUXaire to produce 40% more light than filament type lamps, using the same energy. The quality of light is said to be free from glare, and excellent in retaining color values.

Illustrated information may be obtained from Pfaff & Kendall, 84 Foundry Street, Newark 5, New Jersey.

A Review
New TE Textbook Published

TRAFFIC ENGINEERING — By Theodore M. Matson; Wilbur S. Smith; and Frederick W. Hurd. McGraw-Hill Book Company, New York City. 660 pages, 265 illustrations, price $12.50.

The publication of a new text, "Traffic Engineering" is a welcome addition to the field of highway traffic engineering literature. The result of years of teaching experience at the Yale University Bureau of Highway Traffic, the textbook is an excellent complement to the Traffic Engineering Handbook. While the Traffic Engineering Handbook tells "what" and "how-to-do-it," the text "Traffic Engineering" tells why.

An outline of the various sections of the book will indicate its broad scope. The sections are:

1. Characteristics
2. Regulations
3. Control Devices and Aids
4. Design
5. Administration and Planning

In each of the various sections the authors have gathered together the best available information from many areas of thought and applied it to the solution of traffic engineering problems. Psychology, applied dynamics, mathematical statistics and automotive engineering are some of the disciplines of thought that have been used to develop the principles of traffic engineering.

Written primarily for graduate work in traffic engineering, the textbook combines the theoretical with the practical approach to traffic problems. Its most valuable feature is to combine the results of much research and study into one single publication. While few new subject matters are introduced the information previously has been available only by referring to many different articles, pamphlets or other textbooks. Material sources are well reperenced so that a person may go to original sources if more background is needed for any particular subject.

To write a textbook in a field that is as new and vital as the traffic engineering profession is a most difficult undertaking. Every day we contribute further to our basic knowledge of traffic engineering and that which is accepted as factual today was conjectural only a few years ago. Under these circumstances it is inevitable that some of the references used in the text have since been superseded by later, more complete studies. In general though, the authors have made excellent use of available material and have reference to the latest information available.

The book "Traffic Engineering" will be a welcome addition to the shelf of all in the traffic engineering profession. It is hoped that the availability of the book will spur the growth of interest in highway and traffic engineering among Civil Engineering students and permit instructors of highway engineering to incorporate more of the principles of traffic design, operation and planning into the traditional undergraduate highway engineering courses.

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bility of the possibilities available. During the day the readability is greater than that provided with black on white. At night the reflectorization is a great improvement over the non-reflectorized sign.

The feeling of those connected with this project has been that these signs are equal to any signs in performance and durability, and superior in respect to night visibility.

RICE MOVES TO CORPUS CHRISTI

(Continued from page 261)

YIELD RIGHT-OF-WAY sign which has been successfully used in cities throughout the country. Several articles on the YIELD sign were prepared for publication for Traffic Engineering, Traffic Quarterly, Traffic Digest, Popular Mechanics, American City, Public Works and others.

Mr. Rice served as Traffic Engineer for Evansville, Indiana from August 1952 until accepting the new position at Corpus Christi. Among the accomplishments in Evansville were, the installation of six new one-way streets, and a complete new Radio Controlled Traffic Signal System for the Central Business area.

The new Radio Controlled Traffic Signal System consists of fifty-four (54) intersection controllers, receivers and tone decoders operating remotely by FM Radio from a Master Controller, tone generator and transmitter in the City Hall.

In addition to his membership in the Institute of Traffic Engineers, he is a Registered Professional Engineer in both Oklahoma and Indiana. He is a member of National Society of Professional Engineers, National Safety Council, Highway Research Board and the International Municipal Signal Association.

Mrs. Rice (Dottie) and their two children, Larry and Brenda, accompanied Mr. Rice to Texas on January 1st for the new assignment.

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An open letter to

TRAFFIC ENGINEERS

SAFETY ON TODAY'S ROADS is a story that often gets buried behind the big headlines and glamor appeal about new superhighways.

But the story of modernization of existing highways—and the vital need of funds for improvement—is one we know well.

This story of an acute national need is being told now! The advertisement on the facing page is the first of a new series prepared to acquaint the public with this story . . . and what can be done *NOW* to bring modern safety measures to roads *TODAY.*

Notice how the headline points out that although new superhighways are being planned, safety on today's roads is a *must* now! Yes, gentlemen, this urgent story *is* being told . . . and through this new series, the public will come to know your problems and your solutions. And with this knowledge, they can give the sincere support necessary to put your plans in action.

The first advertisement will appear in the March 23 issue of U. S. News & World Report. Look for it . . . and plan to use it. This is the kind of public relations program that will kindle the spark to awaken public and legislative groups in support of your specific highway improvement plans.

D. O. Opstad

P. S. Reprints of this advertisement are available for use by your office in letters or other mailings. Write, stating number of reprints desired, to: D. O. Opstad, Reflective Products Division, Minnesota Mining & Mfg. Co., Dept. GS-36, St. Paul 6, Minnesota.

traffic engineers are making today's roads safer

Broader, straighter highways of the future will do much to solve America's growing traffic problem. But your traffic engineer isn't waiting until tomorrow to improve existing roads.

His skilled use of modern traffic control devices—signs, signals, pavement markings—are making the roads you must drive today as safe and as convenient as possible. For example, he installs *reflective* traffic signs that guide and guard you 24 hours a day . . . caught in your headlight beam, these signs show *exactly the same* shape, color and message by night as by day.

But more needs to be done!

Funds to speed road modernization are urgently needed by your community and state. *You can help.* Write to your mayor and governor and let them know you stand behind all efforts to make today's streets and highways safer. The improvements specified today by your traffic engineer may save *your* life tomorrow.

When you see traffic signs of vivid, durable "Scotchlite" Reflective Sheeting (in any weather, from far down the road they show exactly the same shape, color and message by night as by day), you know that you and your family are getting maximum nighttime driving safety for your tax dollar.

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APRIL 24-26—DETROIT, MICHIGAN
Annual Michigan Safety Conference, Sheraton-Cadillac Hotel.

APRIL 30-MAY 2—WASHINGTON, D. C.
Annual Meeting Chamber of Commerce of the United States.

MAY 17-18—COLUMBIA, MISSOURI
Eighth Annual Traffic Engineering Conference, University of Missouri.

SEPTEMBER 17-20—DENVER, COLORADO
Sixty-first Annual Convention, International Municipal Signal Association, Cosmopolitan Hotel.

SEPTEMBER 17-20—ST. LOUIS, MISSOURI
Annual Meeting, American Transit Association, Jefferson Hotel.

SEPTEMBER 25 - 28 — SAN FRANCISCO, CALIFORNIA
Twenty-sixth Annual Meeting of Institute of Traffic Engineers, Mark Hopkins Hotel.

OCTOBER 22-24—NEW YORK, N. Y.
Thirty-eighth Annual Meeting American Standards Association (in conjunction with Seventh National Conference on Standards), Hotel Roosevelt.

OCTOBER 22-26—CHICAGO, ILLINOIS
Forty-fourth National Safety Congress & Exposition, National Safety Council.

Membership Applications

The following applications have been received since the list of applicants published last month.

APPLICATIONS FOR TRANSFER

COGGER, George E.
Senior Traffic Engineer
Department of Traffic Control
Room 419, City Hall
Dallas 1, Texas
January 31, 1956 for ASSOCIATE grade

GALLOWAY, Thomas R.
Traffic Engineer
Hazelet & Erdal
531 Dixie Terminal Building
Cincinnati 2, Ohio
February 6, 1956 for ASSOCIATE grade

GOLDIN, Alfred K.
Assistant District Traffic Engineer
California Division of Highways
120 S. Spring Street
Los Angeles, California
February 14, 1956 for ASSOCIATE grade

HAGENAUER, George F.
District Engineer of Research and Planning
Illinois Division of Highways
160 North LaSalle Street
Chicago, Illinois
February 13, 1956 for MEMBER grade

NEW APPLICATIONS

BOESEL, John L.
Senior Civil Engineering Assistant
Los Angeles County Road Dept.
Traffic & Lighting Division
1660 Eastlake Avenue
Los Angeles 33, California
February 6, 1956 for JUNIOR grade

BURBIDGE, Eugene A.
Engineer in Training
Idaho Department of Highways
P. O. Box 879
Boise, Idaho
February 3, 1956 for JUNIOR grade

HEFRON, Roscoe E., Sr.
Highway Traffic Analyst
Michigan State Highway Dept.
Stevens T. Mason Building
Lansing, Michigan
January 16, 1956 for MEMBER grade

LESSIEU, Eugene J.
Planning Technician
Port of New York Authority
111 Eighth Avenue
New York 11, New York
January 23, 1956 for JUNIOR grade

RAY, James C.
Student, Institute of Transportation and Traffic Engineering
University of California
Berkeley, California
February 13, 1956 for JUNIOR grade

VANNICE, Robert E.
Assistant Structural Engineer (Civil Service)
Cuyahoga County Engineer
1900 Standard Building
Cleveland 13, Ohio
January 16, 1956 for MEMBER grade

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Commissioner T. T. Wiley
Department of Traffic
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New York 38, N. Y.

ASF PUBLISHES

(Continued from page 263)

shopper's choice of shopping areas; on trade competition between central cities and their suburbs; on the value of commercial property. Case studies are cited on the economic justification of off-street facilities in terms of business benefits to individual retail establishments and the community as a whole.

Some of the compiled information derives from recent studies made by the Highway Research Board at the Universities of Michigan, California, Washington, Kentucky and Ohio State. Special funds for the latter were made available by the automotive and petroleum industries through the Foundation. In addition, pertinent facts were collected and collated from many other sources, including traffic, parking and marketing surveys, technical papers and business periodicals. Special field studies were made to fill in gaps in current data.

Single copies of the booklet are free; additional copies $1 each. Write the Automotive Safety Foundation, 200 Ring Building, Washington 6, D. C.

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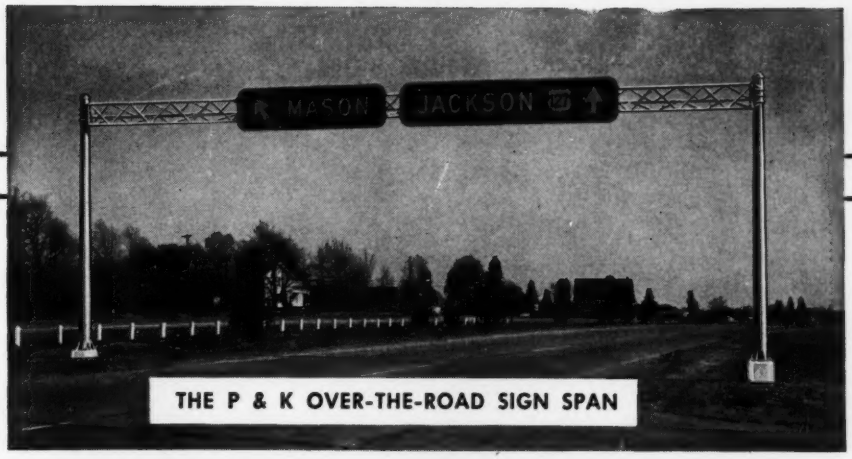

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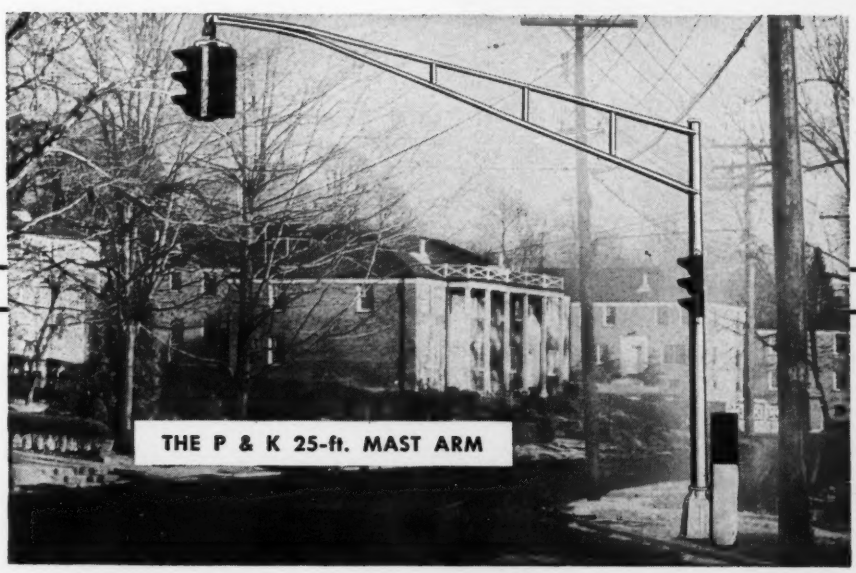
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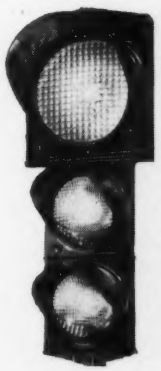

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SECTION NEWS

INDIANA SECTION

The Winter Quarterly Meeting was called to order by Mr. **James Neff**, President, at 10:15 A.M., CST, December 30, 1955, in the Student Union of the Indianapolis Medical Center.

Mr. **Charles Miller**, Director of Traffic, was introduced as a special guest. Mr. **Miller** gave a brief resume of the operation of his department, mentioning that a revised edition of the State Sign Manual should be off the press by March 1. He also stated that serious consideration is being given to the use of the two-section school child traffic signal in the State of Indiana. A trial installation is being placed in operation in Franklin, Indiana. Mr. **Miller** commented that the State Highway Department has embarked upon a program of removing all bridge hand rails that are within 5 feet of the pavement edge, in order to cut down on the accident hazard that now exists among the many narrow structures on state routes.

Minutes of the September 23, 1955, meeting were read and approved. Mr. **Jim Neff** discussed the tabling of the question of unqualified traffic engineers using the title of Traffic Engineer in direct violation of State Statute. The Committee, chaired by Mr. **Hallie Myers**, was reactivated and is to report at the next meeting of the Indiana Section.

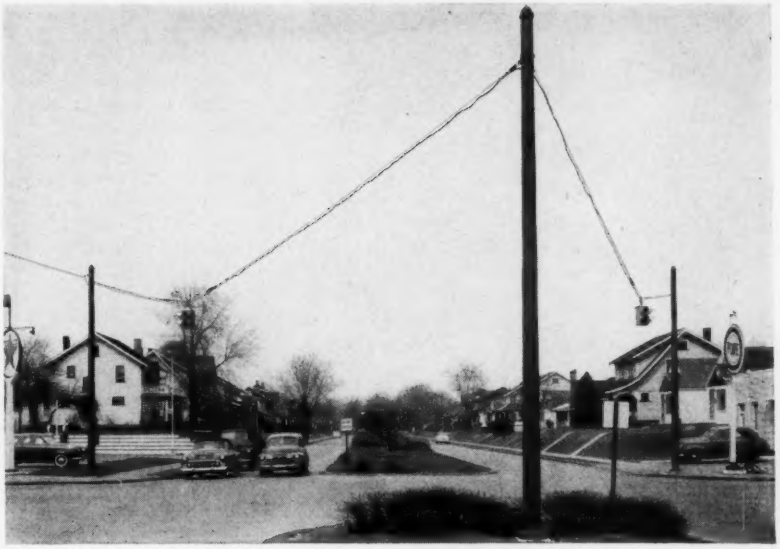
The Secretary-Treasurer made a report to the membership present of the combined Section meeting held at the annual meeting of the Institute of Traffic Engineers.

Mr. **William F. Milner** made a motion that the Secretary-Treasurer of the Section write the Institute concerning the combining of "getting results through Traffic Engineering" into the magazine so that all members of the Institute can get the benefit of said "Results." This motion was seconded by **Hallie Myers** and passed unanimously.

The 42nd Annual Purdue Road School to be held April 2-5, 1956, was discussed. Speakers were suggested and a Program Committee was appointed. Also, a few miscellaneous subjects were suggested for discussion at the meeting with Professor **Petty**, to be held January 7, 1956.

The Program Committee consists of **George Young**, Chairman, **John Carmody** and **William Bilby**, members.

Discussion was held on the possibility of combining the annual Purdue Road School with a District 3 meeting, inviting members of the Michigan-Ohio Sections to participate in the program. It



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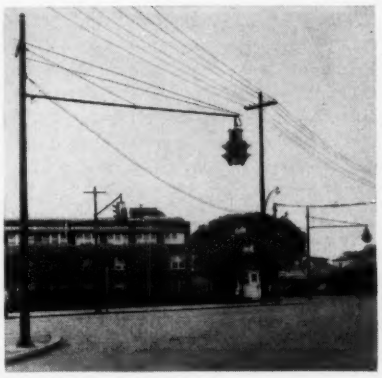

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was suggested by Mr. **Hardy** that one day be set aside for such a program.

A report of the nominating committee was called for by President **Neff**. Mr. **Hallie Myers** gave the report of the committee. Mr. **Myers** mentioned that it had not been customary for the officers to be replaced in office without having the privilege of arranging at least one Road School Program. For this reason, the present officers were nominated for reelection. A new Vice-President, Mr. **William Bilby**, was nominated to replace Mr. **John Baerwald**, who has moved from the jurisdiction of the Indiana Section.

Mr. **George Reyman** made the motion that the Section unanimously adopt the Nominating Committee's report. Mr. **George Young** seconded the motion. The motion was carried.

The meeting was adjourned at 12:45 P.M., December 30, 1955.

Donald W. Barry
Secretary-Treasurer

MIDWEST SECTION

Clipped from Midwest Newsletter, **Richard A. Walons**, Editor.

Congress Street Expressway Opened

On December 15th, several hundred chilled spectators gathered under the Laramie Avenue bridge, saw Mayor **Daley**, Governor **Stratton**, and County President **Ryan** snip the ribbon that opened the Congress Street Expressway from Laramie Avenue to Ashland Avenue. Thus was culminated the first step in this area's stride toward a compresensive superhighway system.

A few minutes after the official opening, the three aforementioned dignitaries led a cavalcade of autos east to the Paulina-Ashland off-ramp. They were, however, preceded a few hours earlier by an unidentified motorist who became the first speeder picked up by the Chicago Police Dept. radar team on the expressway. Likewise the cavalcade was succeeded a few hours later by the world's second biggest traffic jam (the Egyptian pursuit of Moses and his people through the Red Sea being No. 1). The jam appeared to be the result of at least half of the vehicle population of Metropolitan Chicago attempting to get on the temporary ramp at Ashland Avenue. This resulted in a strange combination of odors on the West Side, including burnt scalp, burnt tires, and burnt pots. The last named was accompanied by mama's slow burn when papa finally arrived home.

Business Meeting

The Midwest ITE business meeting, held December 15th at the Chicago Engineers' Club, provided those in attendance with their annual enlightenment on Midwest Section affairs. It also gave members an idea of things to come in the way of section business.

Perhaps the most important part of the evening was the tabulation of ballots for election of 1956 Section officers. The candidates were all elected with nary a vote for any opposition candidate, but with spoiled ballots taking a big slice out of the possible total. Elected president was **Ralph Michel**; vice-president, **George Hagenauer**; and secretary-treasurer, **Dave Baldwin**. **Wayne Volk** was selected as director.

Evan Olmstead, immediate past president, presented his annual report of section affairs, including a review of committee activities. **George Hagenauer** gave our financial picture, a pleasantly bright one for the past year.

A preview of what might come in the way of section legislation came with a proposal that the office of secretary-treasurer be split to lighten the work load on that officer. After considerable discussion, it was agreed that the matter would be referred to the Laws Committee. Thus the membership can expect to be hearing more about the proposal soon.

MISSOURI VALLEY SECTION

President **Joseph J. Feuchter**, who resides in the metropolitan city of St. Louis, has indicated that he will call a meeting of the Missouri Valley Section at a date to be announced by Mrs. Feuchter. Those of us who have served in the top slot of the Missouri Valley Section can well appreciate what a help it is to have an Assistant President. Although Mrs. Feuchter actually makes all the major decisions relating to the Section, Joe only allows her to assume the title of Assistant.

In Kansas City, Mr. **Jack A. Hutter**, Director of the Traffic Department, is now attending to business in a more reasonable manner, and has fewer financial worries since his three-month-old daughter now has a job and is helping with her monthly contributions.

George Fisher, Director-elect from the Fourth District and Director of Service for the City of Wichita, had not, at last writing, succeeded in obtaining a hand to take **Woody Rankin's** place. **George** continues to put out some work for a change.

A. J. "Tony" Basile has been appointed by President **Feuchter** to take over the job of Secretary-Treasurer, vacated by **Woody Rankin**. The membership of the Section is very fond of **Tony**, and is looking forward to a businesslike administration of that office. All of the Section members are inclined to offer such salty comments as, "We

PREMIXED

Cataline Reflective Striping Compound

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This advertisement is in leading trade publications

are glad to get that job out from under Fisher's thumb."

George Lichty of the Missouri Traffic Control Section has been experimenting with practically everything but steel, aluminum, wood and masonite for highway signs since the sign shop at the State Prison burned and commercial sign companies are experiencing difficulty in obtaining sign materials. George's newest productions of paper, rubber and chewing gum signs may very well start a new fad in the sign business.

Leon W. Corder
Associate Editor

METROPOLITAN SECTION

(Clipped from Metropolitan Section Newsletter, **Richard I. Strickland**, Chairman.)

Traffic Delays at Toll Booths

An investigation was recently undertaken by the Port of New York Authority to determine the delay encountered by motorists at points where tolls are collected. Results show that the average time for a vehicle to get through a toll station was 19.6 seconds, of which 8.5 seconds was delay and 11.1 seconds the time taken at the booth itself. The authority is using this data to improve service standards and develop more precise methods of toll collection.

Traveling Section Members

Ed Capillo spent two weeks from November 28th to December 9th in Evanston, Illinois, at the Traffic Institute, Northwestern University. **Ed** observed the instruction given to fifteen metropolitan police officers who received AAA Scholarships to the Traffic Institute's two-weeks course: "Traffic Control Devices and Methods for Police."

Lou Bender and **Ed Wetzel** attended the annual meeting of AASHO held in New Orleans from December 6th to 9th.

Survey Reveals Increasing Uniformity in Laws

In a survey conducted by the American Association of Motor Vehicle Administrators, it was revealed that of 346 bills introduced in 43 State Legislatures, 195 were in conformity with the Code or other nationally-recommended standards.

Of the bills in conformity, a total of 68 have been enacted by legislatures, while 55 failed to pass. The remaining 72 bills have not received a final decision at yet. Only nine of the 151 bills reported not in conformity with the Uniform Code have been passed so far. All of these are relatively minor bills.

In twenty states, not a single bill reported by the Association as not in conformity with recommended standards has been passed thus far.

TEXAS SECTION

Snipped from Tex-ITE, **Jim Saylor**, Secretary-Treasurer.

Traveling Members

Win Carsten and family returned to their old habitation, Seattle, Washington, prior to Christmas. Due to weather conditions they were forced to go the southern route via lower California—6,000 miles round trip—WOW! **Win** is still walking in a crouch.

Bill Brandes and family went "home for Christmas." **Bill** seldom misses the opportunity of spending a few days at Christmastime with his folks in Iowa.

Dick Oliver added a few days vacation to the Christmas and New Year Holidays and spent a week in Toledo with relatives. He reports that the neighboring states are making big improvements in their roads, but there is no place like Texas. The reflectorized centerlines through Indiana and Ohio were worth their weight in gold while driving through dense fog up there.

For Traffic Surveys...
THE TRAFICOUNTER, JR.
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In the News

A training course has recently been completed for five women employed by the City of Amarillo to check parking violations in the downtown area. According to **Harold Miller**, City Traffic Engineer, the Chief duty of these women will be to issue tickets for overtime parking. Instructors of the course were **Chuck McLeroy** in the Traffic Engineering Department and Officer **Davis Betts** of the Police Traffic Division.

In the December issue of the "Reader's Digest" **Don Wharton**, in an article titled "Why Must We Have Fake Traffic Laws?", tells how . . . "At Fort Worth, Texas, which won a national citation for reduction of traffic fatalities in 1954, traffic engineer **T. R. Buckman** uses what traffic engineers call the '85 percentile'. That is, he checks speeds in a given zone, finds what speed 85 percent of the motorists are driving under, then sets the limit at approximately that figure. Thus Fort Worth has some 40 mph zones and some 50 mph zones. Buckman says: 'Since raising our speed limits to 40 and 50, we have seen in several instances a decrease in excessive speed. This indicates that the average motorist will try to confine himself to the speed limit, if he feels that it is a **justifiable** limit.' Fort Worth also sets a good example by removing the 20 mph signs in school zones each summer."

For more driving safety tomorrow's car will have radar-controlled brakes and air-ride suspension systems. To overcome the physical limitations of our vision we will have tail lights that shine down on the road, deceleration lamps so that when a vehicle loses headway we get the same warning as when it brakes, lighting tricks to give a speed check, and windshield target sights to help us judge distance by size relationship.

We may be aiming tomorrow's car —not just steering it; and it will be safer as well as faster.

They are Coming Back

Years ago the United States was plagued by toll roads, toll bridges, toll canals, and toll ferries. Gradually the states shook themselves free of them. Today the toll roads are booming again.

Many states are not waiting to see what Congress will do concerning the 40,000-mile plan for interstate superroads. Eighteen have now embarked in the business of SELLING you fast, safe travel. In these eighteen states more than 1,600 miles of toll road are in use —and 1,100 miles more are being built. They are doing this by setting up business agencies known as "toll road authorities." These borrow millions of dollars, hire dozens (or sometimes hundreds) of contractors, and blast through modern roads in record time.

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There is a lot of howling and debate about whether this is good. Are the toll roads going to peril our "free" highway system? But the facts are that the toll roads are being built at a rapidly accelerating pace. In several instances 200-mile super-roads that couldn't have been built within 20 years with tax money have been completed in 2 years.

The toll roads appear to be a straw in a rising wind. They are showing that the public is determined to get better roads—NOW!

GOOD NEWS — We are pleased to report that **Walt Klapproth** is out of the hospital and well on the road to recovery.

Texas in '58 ! ! !

Bill Brandes, Bob Buckman, Win Carsten, Greg Gregory, Billy Harrison, and **Jim Saylor** lunched together at Amon Carter Airport in early December to discuss plans for the National Meeting in 1958. **Bill** and **Bob** are doing a lot of work on this project and hope to be able to make an optimistic report at the San Antonio meeting.

Sees All—Knows All

Word has come by pack mule from **Skinny DeYoung** that he is stranded on BIG SUR. The way out is blocked on the west by the Pacific Ocean, bridges to the south are all out, the mountains on the east are too high to climb, and directly to the north there is a slip out 70 feet across and 100 deep. The following is an unedited copy of his quarterly report on "What's Doin' In Texas".

Hal Miller has new office space up in Amarillo and he can be right proud of the Space. It is sealed against wind and dust—painted like a well patronized NIGHT CLUB with a special rubber mat on a brand new desk for the user's feet. I stopped for a minute to see **Gregg Gregory** in Waco. We listened to some funny sounds—these turned out to be from **Bob Buckman** miles away. It was soon after Thanksgiving and **Bob** was wondering what happened at College Station on that day. **Win Carsten** left something in south Texas when he moved north and went back to hunt for it just after Thanksgiving. He was reported to be armed—maybe that's why he came back with all that poker money as well as two geese. **Bill Welty** is running for Vice President of the Austin Chapter of the American Society of Civil Engineers. I wonder if they know that he is an electronics bug. I couldn't see **Walt Klapproth** as no visitors were allowed but I called from

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Ozona on my way home and he was yelling about something—probably the food as they don't serve Sloan's Liniment for internal use. **Gene Maier** has his new summer hideout completed. He chose more wisely than I as he can go by sea as well as land. I can't get out even by helicopter—the fog won't let the blades turn—it is so thick. **Bim Greer** and the boys in Austin have had what amounts to a vacation since T.U.'s visit to College Station. **Sam Roper** took a buck from me pretty easily on the same team. **Stew Fischer** was taking a guided tour around the country when I went thru. I hope he writes a report on his trip as I would like to read it. **Joe Nadon** has new offices also —not as elaborate as **Hal Miller's** and the City Manager in El Paso makes **Joe** keep his feet on the floor.

WASHINGTON SECTION

Taken from Washington Section Newsletter, **C. C. Robinson**, Editor.

December Meeting

Twenty-five members were present at the December meeting held at the Cosmos Club to hear an excellent presentation by **Dr. Uhlaner** on the selection of military drivers. The unique testing approach developed by **Dr. Uhlaner's** group has been adopted by the Army and Navy for driver selection. Although military and civilian problems differ in this area, interest in the tests and their implications was well evidenced by lively questions from the group.

Real Estate Section

Frank Twiss is reportedly getting ready to move into his new home in the Potomac Hunt area (so named by early settlers who got lost hunting for Potomac). **Al Voorhees**, master carpenter, is supervising the construction of his new castle slightly down wind from Burning Tree. Early stages of construction included an improvement of the access road, wherein overhead costs were cut by utilizing construction plans left over from the Baltimore-Washington Parkway.

Travel News

Our good Vice President **O. K. Norman** has recently returned from a missionary mission to Yale University where he informed the students on current findings of the Committee on Highway Capacity. While there he also took the guest spot at the New England Section I.T.E. meeting.

..**Bob Burrage** left on January third for a week in Tampa to advise on their parking study—life can be beautiful!

The Chicago Traffic Engineering Department played host to **Buck Voltz** and **Charlie Sullivan** last month while they inspected Chicago's new radio interconnection system.

..**Ed Johnston** was in Denver for the week of December 6th masterminding a "Businessman's Conference". Two hundred and fifty were in attendance representing fifteen western states. On the program were **Harmer Davis** and **C. F. McCormack** (and Governor Pile of Colorado).

Charlie Upham, Sr., is in town for a short holiday visit before returning to Egypt.

Other News of Note

The Washington Section will soon have a new member in the person of **Joe Rice** (Traffic Engineer, Kentucky Highway Department), who will report on January 9th to the Office of the Special Assistant to the Chief of Transportation, Department of the Army, for Transportation Engineering.

Bill Elliot recently appeared as a non-expert witness before the D.C. Utilities Commission protesting a rerouting of the N2 bus line. Pending a final decision, the bus remains where he doesn't want it!

..**Nat Gordon** was honored with a Department of Commerce Incentive Award recently for a suggestion to reduce costs on Federal Aid Urban Projects.

Cigars recently went the rounds at the B.P.R., announcing the arrival of

15 inch cluster of six 3 inch Stimsonite reflectors.

make your traffic markers on the spot

with adaptable

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reflectors

Have highway warning signals always available to meet the changing needs of a construction project or for regular maintenance operations. A few handfuls of sealed Stimsonite reflectors in metal holders, plus a small stock of reflectorized arrows and cutout letters, and it's simple to make an almost unlimited choice of traffic markers on the spot, to fit the job.

Stimsonite gives you the most brilliant warning signal and the greatest durability of all reflective materials. The smooth curved surface of a sealed Stimsonite reflector washes clean. No dust or moisture can penetrate and the molded-in deep colors can't possibly fade. Simply attached by the use of wood screws through the housing, these reflectors can be removed and re-used time and again. Just a few types of metal housed Stimsonite reflectors are shown above. For full details, get in touch with A'G'A Division of Elastic Stop Nut Corporation of America, 1027 Newark Avenue, Elizabeth 3, New Jersey.

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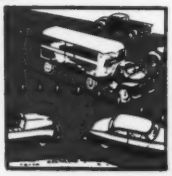

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Alan M. Voorhees (right) receiving Past Presidents' Award Certificate from President Prisk at the January meeting of Washington Section. The meeting was held on January 17 during the week of the Highway Research Board meeting and over 120 members, many from outside of the Washington Area, attended. The principal speaker was Lt. Col. John T. Stapp of the Air Forces Aerial Medical Field Laboratory who described his work and showed films illustrating his personal experiences with rapid deceleration from high speeds.

Philip Solomon, born Wednesday, December 7th.

Title of the Week

Burt Marsh has been appointed Chairman of the Executive Committee of the Committee on Regional Conferences of the Presidents Committee for Traffic Safety. The first meeting of the group was devoted to reading Burt's title.

Charlie Prisk reports that the '55-'56 roster of I.T.E. committees will soon be completed. Members, and particularly Junior Members, are reminded that committee membership is open to all I.T.E. members. Each committee chairman has the responsibility for appointing his committee and those interested in a committee activity should make themselves known to the chairman. The Technical Council is particularly anxious to stimulate greater committee participation by Junior Members.

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The many friends of Mr. Matthew Carey whose professional card appeared on this page for many years will be distressed to learn of his sudden death March 2, 1956.

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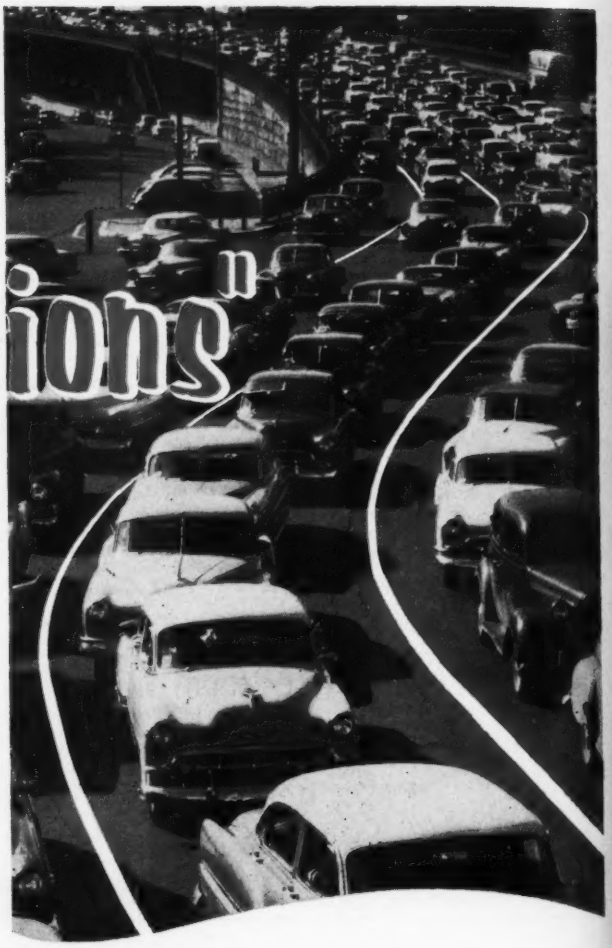

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